THE GROWTH OF WORLD INDUSTRY

By JOHN JEWKES

I

SPECULATIONS regarding the right sequence in which industry and agriculture should develop and their relative importance in contributing to the prosperity of the nation are almost as old as systematic economic thinking.[1] The issues have been fought out in debate between physiocrats and mercantilists, free traders and protectionists, planners and the advocates of the free economy in different ages and under widely varying conditions. It is not unlikely that they will continue to be matters of dispute until the sharp contrasts between manufacturing industry, with its factories, machines, power, and scientific method, and agriculture, with its much more traditional ways, are obliterated by the success of the engineer in mechanizing agriculture or of the chemist in producing food and raw materials in the laboratory. To the inhabitant of the Western world, indeed, the past century and a half stands out as the great age of manufacturing industry, for its growth has influenced his way of living perhaps more than any other single factor. But, paradoxically enough, it is the great industrial countries, the United States and Great Britain particularly, which have in recent years done most to foster agriculture, to supplement and stabilize the farmers' income, and to search for some vaguely conceived balance between industry and agriculture. The debate, therefore, still goes on although within a new set of references.

II

There appear to be, at present, two distinct concepts of world economic progress, the one placing emphasis upon the proliferation of manufacturing industry, the other upon the advantages of international specialization. The first, and the more widely held, can be summarized as follows: manufacturing industry is still limited only because we are watching a continuing process, now in its early stages, which will see its end when industry has spread fairly evenly over the world and, indeed, over each country—much in the way that agricultural pursuits were universal 500 years ago. Progressive industrialization is in the natural order of things. In the three-

[1] Thus Adam Smith in Book III, Chapter I, of *Wealth of Nations*: 'The cultivation and improvement of the country, which affords subsistence, must necessarily be prior to the increase of the town, which furnishes only the means of conveniency and luxury.... Through the greater part of Europe, the commerce and manufactures of cities, instead of being the effect, have been the cause and occasion of the improvement and cultivation of the country. ... This order, however, being contrary to the natural course of things, is necessarily both slow and uncertain.'

quarters of a century before 1938 the world output of manufactured goods increased seven or eightfold.[1] Despite the war it has probably increased further in the past 10 years. The statistics show how rapid has been the growth of manufacturing output in the world and how general has been the industrial expansion. They also reveal how the older industrial countries, whilst continuing to expand absolutely, have lost their relative position.

'World economic equilibrium has not yet been obtained and indeed the world is still a very long distance of obtaining it.'[2] The forces making for widespread industrialization are evident. As between countries, a high average real income is normally associated with a low proportion of workers in agriculture and other primary occupations.[3] History shows that in many countries industrialization has been the direct means by which income per head has been raised or a larger population sustained at the same standard of living. Sometimes this view goes along with the belief that the spread of industry will reduce the volume of international trade, or cause it to expand less rapidly than production in general. It is, of course, this way of thinking which leads states to foster their own industries and which underlies the present-day efforts of the richer countries, either individually or through international organizations, to provide the means of industrialization for the poorer. And it is upon this set of assumptions that academic writers, notably Mr. Colin Clark in his brilliant *Economics of 1960*, have forecast rapid industrialization in the next decade or two, even in the countries of the Far East.

III

So much for the first view. The second, less popular and leading to less spectacular conclusions, is that industrialization, if it is to carry with it an enhanced standard of living, is only possible where certain conditions, not universally or even widely to be found, can be satisfied. The favourable circumstances, the forces which set the wheels turning to produce an industrial revolution—climate, the temperament and aptitude of the people, natural resources—will probably be rare. Manufactured goods, on this hypothesis, will continue to be produced mainly in a few areas of small dimensions. These areas will supply the world freely with cheap industrial goods and draw on other areas for food and raw materials and international trade will increase *pari passu* with production. The association of high industrialization and high income may not be direct cause and

[1] F. Hilgerdt, *Industrialization and Foreign Trade*, Chapter II.
[2] C. Clark, *Conditions of Economic Progress*, p. 341.
[3] C. Clark, op. cit., p. 179.

effect, the industry and the opulence can perhaps be ascribed to a common cause—the natural ability of the people and the occurrence of natural resources. Many countries, such as Canada, Australia, New Zealand, Eire, and Denmark, are rich enough though still much dependent upon agriculture and might be still richer but for ill-starred attempts to encourage industry which have lowered and not raised their income per head.

Some effective statistics can also be woven into this case. The industrial areas of the world, with their factories, machines, and workers, still remain tiny and few—ludicrously tiny in relation to the sweeping social and economic changes they have brought about. Before the last war the annual average value of finished factory products per head of world population was still only about $38.[1] The total number of industrial factory workers probably did not exceed 100 millions, perhaps 4 per cent. of the total world population or 6 per cent. of the population at working ages. In 1938 two-thirds of the world manufacturing output was still to be found in the United States, Germany, and the United Kingdom; the proportion was much the same in 1870.[1] Even in countries normally regarded as highly industrialized, only a relatively small part of the total area of the country and of the working population was devoted to manufacture. In 1939 in the United States the 33 main industrial areas, comprising only 1·7 per cent. of the total land area and 35·4 per cent. of the total population, accounted for 54·7 per cent. of the total wage-earners and 60·4 per cent. of the value of manufactured products in the whole country. A detailed study of industrial change in the United States has shown that 'the most pervasive locational forces have operated to diffuse manufactures among the 200 industrial counties rather than to scatter manufactures broadcast among the remaining 2,800 counties. . . . The facts suggest that manufacturing industry is either affected by a very high degree of inertia or else on the whole it has been reasonably well located with respect to economic advantages.'[2] In Great Britain in 1931 the 38 largest industrial towns, covering 1·5 per cent. of the total area and 35·4 per cent. of the population accounted for 44·2 per cent. of the manufacturing population. And even a great war followed by four years of a vigorous 'balanced distribution of industry' policy has made little change in the broad distribution of industry. Facts such as these, it is argued, reveal manufacturing industry as a secondary way of making a living, still largely confined to a few countries and, within these countries,

[1] F. Hilgerdt, *Industrialization and Foreign Trade*, p. 22.

[2] Goodrich and others, *Migration and Economic Opportunity*, p. 344. It has, however, to be noticed that the last war appears to have led to substantial changes in the location of industry in the United States. A notable case is the expansion of Los Angeles. At the end of the First World War it ranked 28th among the manufacturing centres of the country. At its industrial peak during the Second World War it was second only to Detroit. Its position is now 4th or 5th. (*Fortune*, June 1949.)

still highly concentrated within quite small areas. They lend force to the early observations of Marshall: 'So long as the main conditions of economic development remain nearly as they are now, the chief initiative seems likely to be with countries whose great size, rich natural resources, and accumulated capital enable them to concentrate large and highly organized mental and material appliances on the translation into practice of the architectonic ideas of the scientific student and the inventor.'[1]

These are the two views. They seem to arise out of very different ways of speculating about economic organization and the springs of economic change. The first is a more mechanistic approach. It simplifies industrial change by isolating the known and measurable factors associated with growth—such as the rate of investment—and assumes that quantitative relations which have occurred in one society, or at one time, will recur elsewhere. Those who adopt it underline the similarity between societies. They stress the disadvantages of an early start in the industrial race—what one has done another can surely do better later. And they are probably more ready to predict the future and to advocate policies based on prediction. The second can perhaps be described as the organic approach; it attaches greater importance to the influence of institutions, the problems of organizing resources, even when they are available, and the human stuff out of which a system is built. Those who follow it emphasize the value of accumulated industrial knowledge, skill, and resource, and they think in terms of differences between societies.

The forces which will determine for the future the different ways in which people will seek to make a living are not wholly, and perhaps not primarily, economic, for the great outbursts of practical energy in the past have invariably been released by movements which have had little or nothing to do with economic motive. War, political ideas, the discoveries of the scientist and the explorer have hammered out a shape of things which no one could have foreseen. Even where the factors at work have been more narrowly economic it is doubtful whether the economist has at his disposal knowledge which might have made prediction useful in any real sense. In such affairs the role of the economist is limited to examining what is known of the past, what has made or marred industrial revolutions.

IV

The early stages of industrialization have always been painful, the pains perhaps being more social than economic. Agricultural communities differ from industrial not only in the things they make but in the way they live. Deeply engrained social habits cannot be disturbed without distress.

[1] *Industry and Trade*, p. 159.

Work in factories and life in towns are not, in the first instance, pleasurable.[1] In one way or another the human resistance to change must be overcome by inducement or broken down by force.

The most serious economic impediment is usually the lack of capital, for industrial growth seems to call both for more capital per worker[2] and more capital per unit of output.[3] The cost of factories and machines may be great,[4] but it is probably only a minor part of the bill that has to be met as a prelude to expansion. The other forms of the semi-permanent equipment of society—power, transport, credit, and distribution facilities; towns with public services; governmental institutions—represent an inescapable preliminary cost of the growth of industry.[5] The accumulation of capital demands a present-day sacrifice. The restriction of consumption may be undertaken by the domestic population—if it has a sufficient margin to make that possible without starvation—or it may be undergone by outside lenders. In the absence of outside loans it may be brought about by voluntary saving, by inflation, or by authoritarian systems of rationing. But all large-scale and rapid industrial growth leads to capital shortage, even in regions which are part of an otherwise rich country.[6] In poor, undeveloped countries the shortage may be the decisive brake on change.

It is these obstacles which confront those who are anxious to encourage industrialization in the backward areas. They must find some way of breaking vicious circles. One circle runs as follows: poor countries are poor because they are not industrialized; they are not industrialized because they have no capital; they have no capital because they cannot save; they cannot save because they are poor.[7] Another is: industry cannot develop until transport and other services are provided; such services will not be provided unless clearly there is a demand for them; the demand

[1] Indian labour at the beginning of the twentieth century has been described as 'not responding easily to any stimulus whether of competition, high wages, good conditions, or professional pride in work—uniform material almost entirely without enterprise and initiative' (L. Knowles, *Economic Development of Overseas Empires*). But an early English master complained of his hands in much the same way: 'If you offer them work they will tell you that they must go to lock up their sheep, cut furzes, get their cow out of the pound or perhaps say they must take their horse to be shod that he may carry them to a cricket match' (Lewis and Maude, *The English Middle Classes*, p. 53).

[2] J. J. Spengler, 'Aspects of the Economics of Population Growth', *Southern Economic Journal*, Jan. 1948.

[3] G. Terborgh, *Bogey of Economic Maturity*, p. 95.

[4] In 1937, in the United States, each wage-earner in manufacturing industry operated with $2,474 of capital (S. Fabricant, *Employment in Manufacturing, 1899–1939*, p. 257.

[5] W. Prest, in *War Economies of Primary Producing Countries*, provides a very interesting study of how the lack of such facilities impeded the attempts made during the late war to increase output in a number of agricultural countries.

[6] The advocates of rapid industrialization in the south-east states of America find the shortage of capital a serious impediment to their plans.

[7] H. Singer, 'Economic Progress in Undeveloped Countries', *Social Research*, March 1949.

for them must wait on the growth of manufacture. And it is not always evident that the breaking of these circles will be easier or more fruitful than the pursuit of other lines of economic progress by non-industrialized countries.

Yet a number of countries have successfully made the crossing from agriculture to industry and reached a point where industrial progress seems to have become, as it were, automatically self-generating. What set the wheels going in these cases, how was the crucial transition affected, what costs were involved? At the risk of over-simplifying what is a much more complex picture it may be useful to think in terms of four groups:

First, 'spontaneous' transitions where state direction has been at a minimum and the necessary capital has been provided internally.

Second, 'engineered' transitions where the State has provided most of the driving force and has deliberately organized the sacrifices necessary for investment.

Third, 'assisted' transitions which fall between the first two in the sense that state intervention has been limited, either in extent or time, and where, normally, investment has been provided, at least in part, from outside.

Fourth, 'abortive' transitions where, despite state intervention, the system seems to fail to gather sufficient momentum to justify the use of the term 'industrial revolution'.

There follows one case illustrative of each class.

Great Britain provides an instance of a spontaneous transition. It was given a powerful push in the later stages by a series of important inventions. But its outstanding feature was that the spectacular progress of the nineteenth century was preceded by a long period of preparation which saw the appearance of domestic manufacture, the emergence and organization of a wage-earning class, and the slow acquisition of industrial habits and skills—all long before the appearance of the factory. Britain had a long period of pre-capitalism. At every stage the merchant played a crucial role in providing transport, in distributing raw materials, in discovering markets, in acting as capitalist by carrying stocks and financing the manufacturer. The capital for the first industries came from internal savings. Capital flowed freely to break the bottlenecks inevitable in an expanding economy. The pains of the revolution, severe as they may have been, were minimized by a slow organic growth of the institutions required for our industrial society, by the grafting of a new system on an old stock, by the long maintenance of the link between industry and agriculture, by the creation of industry in relatively small units, by the frugality of the population and the mobility of capital.[1]

[1] G. W. Daniels, *Early English Cotton Industry*; T. S. Ashton, *Industrial Revolution*.

The recent industrial expansion of Russia is perhaps the outstanding case of an 'engineered' transition. We know little enough about it, despite the volume of writing on it, and it is still possible to doubt whether it has enjoyed, after the first pains of the transition, a momentum of its own or whether it continues to be forced along by the efforts of the State. Certainly, however, it has been a speedy and an enforced change. The emphasis throughout has been on large-scale operation, partly, perhaps, for administrative reasons, partly for doctrinal. Little capital has been available from abroad, most of it has been wrested from the citizens by the control of consumption and by inflation. The State, too, has been compelled to create the required industrial skills and to break down old habits by mass education and propaganda and to provide transport, distribution, and housing as an integral part of the engineered economy. This has probably been the most painful industrial revolution to date.

An intermediate case, that of assisted transition, has been that in Japan, where the State was apparently successful in giving an initial impulse to a system which subsequently developed its own motive power. In the early stages the government helped by raising foreign loans, by erecting textile factories, by handling exports and purchasing imports, by buying and loaning machinery. During the later decades of the nineteenth century there was scarcely any important Japanese industry of the Western type which did not owe its establishment to State initiative. But private industry built rapidly upon these foundations so that between the two wars the State played no predominant part in any industry save iron and steel in its primary stages. This is a striking example of assistance applied temporarily at the right points and then withdrawn. But, undoubtedly, other factors contributed to the success. Labour was abundant, cheap, assiduous. Industrial expansion was first built up on native supplies, such as silk. Small-scale operation and widely scattered factories kept down the demands for manufacturing, transport, and social capital to a minimum and foreign capital, much of it British, was available to supplement domestic sources.[1]

India seems to be a case where the transition has hardly got under way. Before the last war income per head and the proportion of the working population in industry were among the lowest in the world. This retardation is, at first sight, surprising, for India would seem to have had many advantages of the kind which have often made for industrial growth: large-scale foreign investment—by 1910 British capital in India amounted to £430 millions;[2] a first-class railway system—by 1913 India had the

[1] G. C. Allen, *A Short Economic History of Modern Japan.*

[2] G. Paish, 'Great Britain's Capital Investments', *Journal of Royal Statistical Society*, Jan. 1911.

third largest railway system in the world; domestic supplies of jute and cotton, coal, and iron ore; the peace and order of British rule; a strong nationalist movement which for nearly 50 years has called for industrialization and self-sufficiency; an opportunity in two world wars to develop industry for military purposes. Yet, by 1900, apart from jute and cotton, no manufacturing industry employed as many as 20,000 persons and even now the authentic industrial impetus seems to be so lacking that some planners are prepared to bring about the desired results by coercion.[1] India, rich in industrial possibilities, has proved poor in manufacturing accomplishment.

Every country, of course, presents peculiarities about which it is easier to speculate than to reach firm conclusions. The recent economic history of Eire, New Zealand, perhaps Australia, may represent instances of abortive industrial growth. The expansion of the United States and, more recently, of Canada would appear to constitute the easiest transitions of which we have record. But in every case there have been pains, the sharpness of which have varied with the speed of the change, the degree to which outside help could be obtained, the power of the State to override individual rights, and the disposition of the people themselves. At least it is clear that machine industry is not something which emerges from simply thinking and talking about it. It is not something spontaneously generated by the provision in prescribed amounts of the objective matter needed for industrialization. In every case it has been the complicated issue of a tangle of social forces which, for lack of a better term, we call institutional.

V

What conditions must be satisfied if a country, having surmounted the first big hurdles, having become industrialized, is to maintain its position among the industrial countries? Can it normally be expected to carry a momentum which will make it difficult or impossible for other, agricultural, countries to get into this field? Or are there good reasons for supposing that, sooner or later, industrial expansion brings about its own retardation, thus providing opportunities for industrialization elsewhere? How far does a country enjoy advantages or suffer from disadvantages just because it had an early start?

The inherent momentum of expansion is usually described thus. The increasing size of the system as a whole brings a double advantage; it renders possible bigger factories and bigger firms and it opens up the way to greater specialization. Specialization lowers costs, widens the

[1] *A Plan of Economic Development for India*, p. 55: 'Practically every aspect of economic life will have to be so rigorously controlled by government that individual liberty and freedom of enterprise will suffer a temporary eclipse.'

market, and creates scope for more specialization. Expanding profits create an internal source of profits which can be ploughed back. The rising standard of living makes voluntary saving easier. Scientific interest branches out increasingly into technology and towards economic objects. Each new invention opens up a wider range of technical exploitation of the work of the scientist.[1] Checks are inevitable: crucial materials may be scarce, holding up the line as a whole; technical development may lag at one stage for a time; the trade cycle may apply a brake periodically. But, so long as men are free and goods, capital, and labour are mobile, these checks will be temporary.

This is undoubtedly a reliable general record of the experience of many industrial countries at some stage in their growth. It represents, to take the most spectacular example, what has been occurring in the United States in the past 50 years by which that country has raised itself to what appears to be an almost impregnable position as *the* industrial producer of the world.

There is, however, the conflicting theory that every industrial country will ultimately suffer from retardation or even decline. The alleged disadvantage of the early start may be summarized in the form in which it is normally applied to Great Britain (though oddly enough not to the United States, which has now had almost a century's experience of industrial expansion). Pioneer industrial countries, as all pioneers, will make costly mistakes which other countries, following on, will avoid. The pioneer country will find itself with obsolete equipment and badly located industries. Its business men will become old fashioned and torpid. So its industrial supremacy will slip away. The analogy is the biological one of growth and decline in a mortal being.[2]

Now, no one can deny that this *may* happen. Business men, or even economic dictators, may suddenly change their character and hang on to industrial antiques much as old people cherish the domestic equipment of their youth.[3] But, of course, this theory goes farther than that and makes the very odd suggestion that grandsons will be lethargic *because* their grandfathers were energetic.

Put in its crude form the theory of the disadvantages of the early start seems to make little sense. For if an early start is a disadvantage, the happiest position for any country would be that in which no start had ever been made at all, or indeed no start ever would be made. It is

[1] A. Young, 'Increasing Returns and Economic Progress', *Economic Journal*, 1928.

[2] See a notable article on this subject by F. R. J. Jervis, 'The Handicap of Britain's Early Start', *Manchester School*, Jan. 1947.

[3] Cf. Toynbee (abridgement by Somervell), *A Study of History*, p. 330: 'If one were to single out the point in which Great Britain has been most at fault, one would put his finger on the conservatism of our captains of industry who have idolized the obsolescent techniques which had made the fortunes of their grandfathers.'

difficult to believe that the future of the British textile industries would be brighter now than it actually is if no pound of yarn had ever been spun here. Or that Japan and Germany, by having had much of their machinery blown to bits in the late war, have benefited by being relieved of the disadvantages of an early start. Do these disadvantages last for ever or merely for a term? And is it a mistake to establish now new industries in Great Britain since, by definition, these will be early starters? Industrial progress consists of discarding old methods for new. There is no reason to think that this is inherently more difficult, or more likely to breed stifling inhibitions, than the installation of the new methods from scratch.

There are, however, other more solid grounds on which it may be suggested that industrial supremacy may contain the seeds of its own decay and that industrial activity may, thereby, be encouraged elsewhere.

The first is that an industrial revolution can never be carried out once for all; the whole of the industrial life of a nation is the same continuing process. The features of the early stages of an industrial revolution are not really unique. Every industrial country, if it is to avoid decline, must be prepared to meet the pains and cost of adjustment however invulnerable its position may momentarily appear to be. Professor A. F. Burns[1] has established, from a study of American conditions from 1870, that most industries suffer, after a time, from an appreciable and continuous weakening of their speed of advance. This evidence is of special significance because it is drawn from an industrial system which was expanding rapidly and was probably not showing any general retardation in its rate of advance. From this he deduces that 'retardation in the growth of individual industries is one of the expressions of the progressiveness of American industry'. Professor G. Stigler[2] has produced further evidence that the rate of growth of an industry group is associated with the heterogeneity of the rates of growth of the industries constituting the group. In brief, flexibility is a prerequisite for the maintenance of industrial supremacy. The decline, relative or absolute, of individual industries is the condition precedent to the maintenance of progress in the system as a whole. Progressive industrial systems are continually discarding types of employment and equipment in favour of other types which will yield a higher return.

Now flexibility means upset for individuals and the disturbance of expectations. Workers will be called on to change their jobs, entrepreneurs to scrap equipment, savers to provide new capital. This is the same problem in kind, if not in degree, as that confronting the backward countries undertaking industry for the first time. But an advanced

[1] Burns, *Production Trends in the United States since 1870*, Chapter IV.
[2] Stigler, *Trends in Output and Employment*.

industrial country will have created classes and institutions, vested interests each of which, it is arguable, will seek, in the last resort by political action, to maintain its own position. The entrepreneur may be powerful enough to force the State to give him protection, the trade union may seek to maintain the same earnings in the same industry for an undiminished number of workers. Of course, the community as a whole cannot, by staking its claim, determine its economic standing (unless it can find some benefactor in the international field). But the efforts of groups to do so may be successful and, by delaying necessary readjustments, may undermine the position of an advanced industrial country. Some such cause, probably, lay at the root of the British industrial decline between the wars. Of course, industrial retardation of this kind is not inevitable. Even in a competitive society, where class interests do not always or fully coincide, it is conceivable that each group might recognize the degree to which its interests coincide with the interests of others and might be prepared to pay the price of restraint for the maintenance of some framework of society, commonly deemed desirable. This calls, however, for a high level of public intelligence and a well-developed sense of social responsibility.

A second possible retarding force lies in the steadily rising claims for consumption or leisure which may be made by an advanced industrial society. Before the last war it was often supposed that the stability of industrial countries was most likely to be disturbed by over-saving and the absence of profitable investment opportunities. But the view that a too low level of consumption constituted the continuing danger to stability has been changed by the destruction of equipment in the last war, by the movement towards more equal distribution of income, and by heavy taxation destructive of saving. No one stresses in these days the dangers of secular stagnation due to insufficient spending. Veblen[1] sought to account for the rise of industrial Germany by contrasting the frugality of its hard-working population, content with a relatively parsimonious income with that in Great Britain, where wasteful consumption and leisure gradually came to be regarded as inalienable rights both by the rich[2] and by the working classes.[3] Veblen assumed that increased consumption and a higher regard for leisure necessarily make for inefficiency. In that, of course, he was wrong. But there are at least three ways in which over-

[1] *Imperial Germany*, Chapters IV and VI.

[2] Who had learned 'to consume large incomes with that unobtrusive efficiency that marks the gentleman of inherited wealth who has had the benefit of lifelong experience in a community of wasters'.

[3] With their high level of 'mandatory expenditure on decencies, physically superfluous and commonly aesthetically obnoxious' and their 'preoccupation with sportsmanlike interests and values which has spread from the levels of gentility down through the body of the population, until this category of dissipations has become almost the sole ground of common interest on which working men meet or hold opinions'.

anxiety to cash in on the fruits of industrial progress may defeat itself. First, by raising consumption to such a level that the necessary scale of new investment becomes impossible. Second, by forcing consumption into such channels as to reduce efficiency. (It is odd, for example, that Great Britain had, at the end of the nineteen-forties, the most expensive medical service but one of the poorest dietaries among industrial countries; there clearly was something to be said for a little less medicine and a little more food.) Third, by raising expectations concerning amenities to the point at which few or none are prepared to enter the stern and unpleasant occupations—the problem of manning the British coal-mines is a case in point. The economist, of course, is not specially qualified to pass judgement on these aims and valuations. But it is open to him to suggest that they may well be self-frustrating. Certainly if they normally take possession of advanced industrial countries, industrial supremacy is likely to be ephemeral.

A third possible major retarding factor is the increased scale on which a concentrated industrial region must provide tertiary industries—transport, distribution, and the like—in order to integrate the more and more specialized industrial units into a co-ordinated working system. Mr. Colin Clark[1] has shown that industrial expansion has almost universally been accompanied by a more than proportionate growth of these tertiary services. The proportion of the working population engaged in manufacturing proper appears to reach a peak and then decline. In the United States the peak was reached in 1920; in Great Britain and France in 1900; in Germany in 1925; in Japan in 1920. The peak is surprisingly low—in the United States about 30 per cent.; in Great Britain a little higher. In most industrial countries the proportion of the working population in commerce, transport, and other services has already far surpassed that in manufacturing proper. Now the growth of the tertiary services is sometimes spoken of as if it were the *cause* of increased production and a higher average income. But the relation is really more complex than that because these services are in part producer services, in part consumer services, and it is difficult to disentangle the elements. Suppose, for instance, an industrial region expands to the point at which the density of population makes it necessary, if people are to get to their work at all, to build a costly underground railway. In so far as this is essential for getting people to work it is one of the costs of industry. In so far as it is used by people to go into the country-side on Sunday mornings, or in so far as people like riding on it as a leisure occupation (if there are such), it is not a cost of that particular way of locating and organizing industry. There may be

[1] C. Clark, *The Conditions of Economic Progress*, Chapter V. J. A. Hobson, *The Evolution of Modern Capitalism*, Chapter XVI, had seized upon the same point much earlier.

no way of measuring these tertiary costs, but the presumption is that they pile up rapidly in the older areas and they may ultimately constitute the opportunity of infant industrial areas, operating economically in smaller social units, to break into export markets or produce more economically for themselves.

There are, of course, many other forces which may finally impede the growth of established industrial areas. They are probably less important than those already mentioned. It is sometimes argued that more automatic machinery makes it easier for backward countries to industrialize by reducing the differential advantage possessed by the skilled workers of the older industrial areas. But increased mechanization often puts a premium on advanced technical knowledge, skill, and experience in the design, development, and operation of the new machines. It is sometimes argued that the older industrial areas will finally succumb because of the depletion of their natural resources. But countries with high technical knowledge become extraordinarily skilful in discovering new sources and new ways round threatened material shortages. It is sometimes asserted that industrial skills can now be more easily transferred from one country to another than formerly. But there seem to be grounds for scepticism about the ease of transference of 'know how' from old to new industrial countries. For 'know how' involves two things: watching what the other does, which is easy, and then applying his methods with such modifications as are called for by the new environment in which they are to be applied, which is very difficult. It used to be argued, before the war, that the slowing down of the rate of population, held to be typical of mature countries, would inhibit further advance. But a market can just as well be large with a few people at a high standard of living as with a lot of people with a low standard of living. And, in any case, present population trends have rendered the pre-war population estimates obsolete.

It is difficult to assess the relative importance of the points raised in this section. But one reasonable deduction would be that, from the technical and more narrowly economic angle, the established industrial countries have a big pull over future competitors, not so much in the actual possession of capital equipment—though that advantage may be considerable—as in the accumulation of their scientific knowledge and, above all, in their experience of the process of trial and error by which the innumerable bits of a complicated economy can be made to work together. There is nothing inherently impossible in a future in which the manufactured goods of the world would be largely made in a few places with the rest of the world drawing on those sources, making a better living by supplying food and raw materials than would be possible for them in any other way of life.

VI

In the long run, in so far as economic motives rule, people will try to make their living in the easiest way. Whether they move towards industry or towards agriculture will be determined by the yield of one hour's work and the rate at which one type of goods exchanges for the other. As for the future of the terms of trade between industrial and agricultural goods, one may take one's choice between a number of differing estimates. One may believe that the world is faced with starvation, due to the prodigal exploitation of the basic fertility of the earth; or that the problem of the future is a surplus of food and raw materials arising out of improved agricultural technique and the limited capacity of the human stomach. The pros and cons have been exhaustively listed in the Report of the Royal Commission on Population, 1949.[1] Generally speaking, in the past half-century, the rate of exchange between industrial and agricultural goods has favoured industrialization. Output per head has increased more rapidly in industry than in agriculture;[2] a unit of industrial goods has, apart perhaps from the period 1921–9, purchased an increased volume of agricultural products.[3] But it would be reckless to say that this will be true of the future.

One conclusion is, however, less risky than others. The equilibrium between industry and agriculture must be a moving point. If, for any reason, industry extends through the world, each advance would make the next advance less likely. For the consequent diversion of resources away from agriculture combined with the generally accepted inelasticity of demand for agricultural products, would tend to move the terms of trade sharply in favour of agriculture.[4]

VII

To sum up: One hundred and fifty years after the invention of the major mechanical devices which gave form to modern industry, the population of the world is still largely engaged in agriculture, and manufacturing industry has flourished only in a limited number of spots. The balance between industry and agriculture may, in the future, change more rapidly than in the past. The mere congestion of mechanical and social equipment in the existing industrial areas may produce atrophy and lead the risk-taker to employ his enterprise elsewhere. Industrial societies may inevitably create institutions and social habits which undermine the foundations

[1] Chapter X.
[2] G. J. Stigler, *Trends in Output and Employment.*
[3] C. Clark, *Conditions of Economic Progress*, p. 453.
[4] C. Clark, *Economics of 1960*, assumes a 90 per cent. improvement in the terms of trade in favour of agricultural products between 1925 and 1960.

of their former success. The discovery of new supplies of known raw materials or of new raw materials with industrial potentialities may completely change the location of industry. Or the work of the scientist may render meaningless the useful distinction made by the economist up to now between industrial functions and agricultural functions. The evidence of the past is, however, on the whole against such suggestions. Modern industry draws the means of its growth and development from a deep-rooted system of science and technology which becomes stronger with the years and which, therefore, would appear to confer persisting advantages upon the nations which possess it.

MERTON COLLEGE
OXFORD

REAL INCOME AND ECONOMIC WELFARE

By A. C. PIGOU

THE Editor of the *Oxford Economic Papers* has invited me to comment on Professor Samuelson's article on 'The Evaluation of Real National Income' in the January 1950 issue, with his very courteous Appendix on my treatment of the matter in Part I, Chapters 5 and 6, of the *Economics of Welfare*. It is nearly twenty years since my last revision of that book and it is not surprising that serious defects in my treatment have been revealed. I do not want to challenge Professor Samuelson's argument on any substantial matter. The most useful way, I think, in which I can comment is by saying in my own language—his tools come unhandily to me—how these things seem to me to stand now.

I

For any investigation in this field the starting-point is plain. If real income consisted of a single sort of measurable homogeneous commodity, it would vary from time to time in proportion to the quantity of this commodity contained in it. But in actual life real income is made up of a large number of heterogeneous commodities. If these were bound together in such a way that their several quantities always altered in the same proportion, real income would vary in accordance with this proportion. We should still have an unambiguous physical measure of change. If conditions were such that, when the quantity of one commodity embraced in real income increased (or decreased), the quantity of none decreased (or increased), we would be able to say of the real income in one situation that it was greater or less than the real income in another; though we should not be able to specify a proportion in which it was greater or less. In actual life it will only happen rarely that even the second less stringent of these conditions is satisfied. In general, therefore, it is impossible, by means of any physical test, to say whether one real income is larger or smaller than another in a specified proportion, or even to say whether it is larger or smaller at all. When we read that real income, or the part of it represented by industrial production, is 5 or 10 per cent. larger in one year than in another, this cannot be a true statement of *physical* fact. The real incomes of the two years are physically incommensurable, and no algebraic manipulations, useful as these may be for some purposes, can get over that. Where do we go from here?

II. The Problem

Let there be two situations, I and II, in which there are equal numbers of persons, and let their aggregate money incomes (all of which are expended in buying real incomes) be equal. In both situations real income is made

up of the same various kinds of heterogeneous measurable items. In the first situation the quantities of these items respectively are x_1, x_2..., and their prices a_1, a_2... . In the second situation the quantities are y_1, y_2..., and the prices b_1, b_2... .

It follows, of course, that $a_1x_1+a_2x_2+\ldots = b_1y_1+b_2y_2+\ldots$.

Suppose that the values of the x's, a's, y's, and b's are such that (1) $a_1x_1+a_2x_2+\ldots$ is $>$ or, alternatively, is $< b_1x_1+b_2x_2+\ldots$ in a given ratio and (2) that $b_1y_1+b_2y_2+\ldots$ is $>$ or, alternatively, is $< a_1y_1+a_2y_2+\ldots$ in a given ratio.

What inferences about (1) real income and (2) economic welfare respectively can be derived from these statistical data? This is our problem.

III. Inferences about Income

Under this head consider first the relation between the actual real income of the first situation and the potential real income of the first situation's pattern in the second. That is to say, given that the real income of the first situation comprises x_1, x_2... amounts of the several items, is, so to speak, of x pattern, what can be said about the relation of this actual income to the potential income *of this pattern* in the second situation?

If we know that in the second situation constant returns prevail everywhere, we can infer that the price of any nth item will be the same in that situation if x_n units of it are being produced as if y_n units are being produced. The prices actually found in this situation will, then, also be those that would rule for the quantities proper to the first situation. Hence $b_1x_1+b_2x_2+\ldots$ is the aggregate price for which the real income of the first situation could be purchased in the second. Hence, given that $a_1x_1+a_2x_2\ldots > \text{or} < b_1x_1+b_2x_2+\ldots$ in a given ratio, the potential x pattern real income in the second situation is greater or less than the actual real income of the first situation in this ratio.

If we do not know that in the second situation constant returns prevail everywhere, we cannot claim that b_1, b_2... are the prices that would prevail in that situation if x_1, x_2... (or some multiple of them) were being produced instead of the actual y_1, y_2... . Hence to know that $a_1x_1+a_2x_2+\ldots$ is $>$ or is $< b_1x_1+b_2x_2\ldots$ in a given ratio does not enable us to say that the potential x pattern real income in situation II is greater (or less) in a given ratio than the actual real income of situation I, or even that it is greater (or less) at all. We may, indeed, hold in a general way, as I did in *The Economics of Welfare*, that the 'errors' may be expected so far to cancel out that the potential x pattern real income of situation II is *probably* greater (or less) in some degree—though not in a given degree—than the actual real income of situation I. But this sort of *a priori* hunch is perhaps not worth much.

Consider, secondly, the relation between the actual y pattern real income of the second situation and the potential real income of the second situation's pattern in the first. The arguments developed above obviously hold good here also with appropriate verbal adjustments.

There is clearly nothing to prevent *both* the potential x pattern real income in situation II being greater (or less) than the actual x pattern real income of situation I; *and also* the potential y pattern real income in situation I being greater (or less) than the actual y pattern real income of situation II. There is nothing, that is to say, to prevent this *in a general way*. As we shall see immediately, however, in a certain special case this state of things entails a contradiction and is, therefore, impossible.

IV. Inferences about Economic Welfare

Case 1

First suppose that in situation I all purchasers' tastes and purchasing power are alike; that no change in any of them takes place in situation II; but that in that situation there is a change either as regards aggregate resources at work or as regards technique in some or all industries.

Here *prima facie* we may argue as follows. If in situation II potential x pattern income is *smaller* than actual x pattern income in situation I, we know that purchasers prefer the actual y pattern income of situation II to *something less than* the actual x pattern income of situation I. But this does not imply that they prefer it to that actual x pattern income itself, and so allows no inference about economic welfare. If, however, in situation II potential x pattern income is *larger* than actual x pattern income in situation I, then, since each purchaser must prefer what he actually buys to what he could have bought, and since each could have bought more x pattern income in situation II than he does buy in situation I, his economic welfare must be larger.

This, however, as Professor Samuelson has shown, is not exact. Each individual consumer, when y pattern income is actually being produced, knows that whatever he individually does will not make prices differ from b_1 or b_2... . Therefore the prices *which he thinks* of when deciding how much of anything to buy are b_1, b_2... . What matters to him is his share of the potential x pattern income, *as he thinks it would be*, in situation II. Given then that this *imagined* potential x pattern income in situation II is larger than the actual x pattern income in situation I, it follows that economic welfare in situation II is larger than in situation I irrespective of what the potential x pattern income of situation II actually is. That is to say, in the conditions I have here supposed, if $a_1 x_1 + a_2 x_2 + \ldots > b_1 x_1 + b_2 x_2 + \ldots$, economic welfare is larger in situation II.

In these circumstances it follows that imagined potential y pattern

income in situation I cannot be larger than actual y pattern income in situation II. That is to say, $b_1 y_1 + b_2 y_2 + \ldots$ cannot be $> a_1 y_1 + a_2 y_2 + \ldots$. For that would entail economic welfare being larger in situation I than in situation II: which contradicts what was established above. When constant returns rule in both situations, so that imagined and true potential incomes coincide, what has been said of imagined potential incomes also holds of true potential incomes. A restrictive condition is in fact imposed in this special case excluding a relationship which, as we saw above, is *in general* admissible.

Case 2

Secondly, suppose that, as before, everybody's tastes and purchasing power are the same in situation II as in situation I, but that the tastes and (or) purchasing power of different purchasers differ from one another; while, as before, there is a change on the supply side.

In this case it is never possible to infer from price and quantity statistics how economic welfare will differ in situation II from situation I. Given that $(a_1 x_1 + a_2 x_2 \ldots) > (b_1 x_1 + b_2 x_2 \ldots)$, it is necessary, as before, that the actual y pattern income bought in situation II must be preferred to the imagined x pattern income which might have been bought. But it is not necessary that this imagined x pattern income of situation II, though it is larger than the actual x pattern income of situation I, yields more economic satisfaction than that does. For people who get more may have less keen desires for the additional things they get than people who get less had for the things of which they are deprived. Thus suppose that there are only two sorts of commodities, bread and beer, bread only being desired by one set of consumers and beer only by another set; and that bread becomes cheaper, but beer dearer. Economic welfare may obviously be rendered greater if the forms of the utility functions of the two groups for bread and beer are of one sort and less if they are of another sort.

Case 3

As in Case 1; but here tastes are supposed to be changed uniformly; while the quantity of resources at work and technique are not changed at all. If $(a_1 x_1 + a_2 x_2 \ldots) > (b_1 x_1 + b_2 x_2 \ldots)$, we know, indeed, that in situation II the actual y pattern real income that prevails is preferred to the imagined x pattern real income which might prevail. But we do not know whether the imagined x pattern real income would yield more satisfaction in situation II than the smaller actual x pattern income of situation I, because tastes in the two situations are different. No inference can, therefore, be drawn about comparative economic welfare. Thus, suppose that real income consists only of a single sort of commodity, the aggregate supply of which is fixed. It is obvious that, if people come to care much

more than before for this commodity, their economic welfare (satisfaction) will be increased; if they come to care much less, it will be diminished. But price quantity statistics cannot distinguish these cases.

More complicated cases

It is unnecessary to discuss more complicated cases, where tastes and purchasing power, being alike for all, both these and also technical conditions of production have changed, or, where, tastes and purchasing powers not being uniform, they and technical conditions have both changed. It is evident from what has already been said that no inference about changes in economic welfare can be drawn from price quantity statistics.

Thus it is only in our Case 1 above, where quantity of resources and technical conditions have changed and tastes and the purchasing power are alike for all purchasers and have not changed, that inferences about economic welfare are possible.

KING'S COLLEGE,
CAMBRIDGE.

SOCIAL ACCOUNTING TODAY[1]

By DUDLEY SEERS

THE first part of this paper discusses the economic meaning of some of the conventions used in the National Income White Paper, and the second the usefulness of the main economic documents currently published for judging the government's policy of economic stabilization.

I. White Paper Definitions

Every year the National Income White Paper increases our knowledge about the structure of payments in our economy, and the latest White Paper contains innovations which are technically more striking than for some years past. The most important are the tables (3 and 4) showing estimates of output of the various sectors of the economy (from 'Agriculture' to 'Public Authorities') and the first official analysis of salaries and profits between sectors. This can be extended, when the promised industrial analysis of profits is provided, to a complete picture of the industrial composition of income. Even the rather bare framework at present given increases substantially our insight into the economic system.

Secondly, direct estimates have now been made of capital formation for 1948 and 1949, so that for these years this item is no longer obtained as a residual. In passing we note that the authors do not find the need for the line called by the American estimators 'Statistical Discrepancy'.[2] This check also, of course, strengthens the estimates for savings.

The Balance of Payments

On the debit side there are a number of deficiencies still not made good. One of these is that the White Paper, apparently unwillingly, still uses the Treasury's definitions in the Balance of Payments.[3] It states that the conventions adopted (which are broadly on a 'cash' as opposed to 'income-and-expenditure' basis) 'restrict somewhat the scope of the term "external assets" in the capital account'. It anticipates that 'these logical inconsistencies will be put right in future papers on the balance of payments'.[4]

[1] This paper was first read to a discussion group of Oxford economists convened by Mr. Hicks.

[2] The meaning of this line in the American estimates is, however, not very clear, since if the two methods of computing aggregate national income yielded widely divergent answers, the estimators surely would, and should, try to narrow the discrepancy. Hence it must be an indicator of the amount of reconciliation rather than of accuracy.

[3] One item, the 1948 payment by India of £45 m., treated by the Balance of Payments White Papers as a current account item, the authors of the National Income White Papers were unable to tolerate in their current account.

[4] These words conjure up the shadow of a suspicion that the Treasury's hand is being forced.

Meanwhile the White Paper gives us a strong hint to deduct item 47*b* from the current account deficit (which means treating oversea investment of oil companies and the increase in exports shipped but not paid for as increasing our assets *vis-à-vis* the rest of the world). The effect of this step is as follows:[1]

(£ *millions*)

	1938	*1946*	*1947*	*1948*	*1949*
Current account deficit as given . .	70	370	600	150	70
Correction.	..	−75	−100	−100	−80
True current account deficit . .	70	295	500	50	−10

It seems therefore that, using more meaningful conventions, the economy was already in overall balance for 1949, though this was apparently because deficits in the second and third quarters matched surpluses in the first and fourth quarters.[2]

There is, however, a further unrealistic feature about the deficit, as the White Paper suggests, in that it is entitled 'net lending to the United Kingdom' whereas, in fact, some of the capital receipts create no liabilities. We can correct for these non-loan items as follows:

(£ *millions*)

	1938	*1946*	*1947*	*1948*	*1949*
True current account deficit (from above)	70	295	500	50	−10
Less Gifts from Australia and New Zealand	..	..	−30	..	−16
Less Gross Grants under European Recovery Programme* . . .	..	..	..	−96	−258
Plus Net aid granted under Inter-European Payments Agreement by the U.K.*	..	..	..	+6	+45
Net increase in oversea liabilities . .	70	295	470	−40	−239

* Information provided by London office of E.C.A.

The last line must still be treated with caution. Much of the increase in capital assets is in respect of emigrants' funds or other private capital outgoings which will make no appreciable contribution to our future earnings of foreign exchange. Moreover, the conventions used here are legalistic rather than realistic, in that a full obligation to settle liabilities is assumed,

[1] The step amounts to bringing the account from an imperfect cash basis to an 'income and expenditure' basis.

[2] See *Bulletin of the Oxford Institute of Statistics*, May 1950. The fourth quarter as shown there had a deficit, but a substantial 'increase in foreign trade credit' had been written into that quarter's figures to put them on the conventional basis.

whereas many of the government loans, both in receipts and payments, should perhaps be somewhat discounted. Despite these qualifications, or possibly because of the last, the conclusion is unmistakable that the United Kingdom, contrary to the general impression, has been reducing her indebtedness to the rest of the world over 1948 and 1949.[1]

Depreciation Allowances

The provision for depreciation by enterprises has increased in the following series over the last four years, according to the White Paper: (£ m.) 590, 660, 675, 865. The 1938 estimate was £360 million, and if we presume that to be correct, and allow for a capital goods price rise to 2½ times the pre-war level, the estimate for 1949 cannot be far from an estimate of the depreciation of capital at current replacement cost. The deliberately excessive allowance for depreciation of new capital was just about balancing the deficiency in allowances on old capital, due to the use of original cost instead of replacement cost as a basis for depreciation allowances.[2] However, the allowance for 1948 in particular was apparently lower than replacement cost, and the continued use of legal depreciation allowances has provided a most unsmooth series for these years, because of the sudden changes in legal rates. There is, of course, a case for taking the legal allowances in that they can be more accurately estimated, as the White Paper argues (p. 50), and to choose between estimating accurately what one does not quite want or estimating inaccurately what one does want is always a dilemma. Still, the substantial revisions made in the estimates of depreciation each year make one doubt the strength of this contention. In view of the information in official hands on the rate of capital growth and on the price changes for capital goods, one would have thought that a more useful 'net' aggregate would now be yielded by trying to estimate replacement cost. The estimate of legally allowed depreciation should, of course, be retained for some purposes such as the analysis of corporate income appropriation (Table 16).

Inventory Gains

The greatest difficulty in using the White Paper arises, however, from the treatment of inventory gains. In a way the White Paper for 1950 shows a considerable improvement in this respect, since an estimate of the price element in inventory increases is given for the first time, and the aggregate 'Gross National Product' does not include these inventory

[1] This is as a result of current transactions. As a result of the devaluation of sterling, however, the sterling value of our dollar debts, including those to international organizations, increased by £809 m. (*Hansard*, vol. ccccIxxiv, col. 53) and credits given under exchange guarantees amounted to £60 m. (Cmd. 7933, Table 26).

[2] This balance looked at from another view is one between excessive depreciation allowed against industrial profits and deficient depreciation allowed against rent.

gains. We realize now what large analytical errors changes in inventory gains may have caused for past years, if as large a fall as £325 million is possible between 1948 and 1949. However, the satisfaction felt by the authors because they are 'following the practice' recommended by the authorities both of the League of Nations and of the United Nations is not very securely based, for the implication of the reports cited is clearly that, as a (potential) capital gain, this item should be excluded from all income aggregates. The White Paper defines, however, National Income and National Expenditure and all the relevant components of the Social Accounts in such a way as to include them. So one has to pick one's way most carefully through the White Paper in order to avoid being misled on this point.

When one comes to profit analysis the danger of being misled is even greater, for all the profits figures shown (other than in Tables 3 and 4) include inventory gains, and the underlying movement of profits made in trading proper, or 'true' profits, cannot be distinguished. This is a great drawback for nearly all national income research, whether one is dealing with the factor cost side (profit margins) or with inflationary 'gaps' (savings propensities).

The distribution of income by source (Table 5) shows a slight fall in trading profits of companies between 1948 and 1949. All the profit items in this table include, however, inventory gains which fell sharply. The effect of allowing for inventory gains would therefore be to reveal an increase in company profits net of inventory charges, but an increase of an uncertain amount. The relevant figures are:[1]

(£ *millions*)

	1948	*1949*
Income from farming	258	283
Profits of sole traders	735	745
Trading profits of companies . . .	1,685	1,590
Operating profits of public enterprises .	126	140
Total profits and inventory gains . .	2,804	2,758
Less Inventory gains	400	75
Total profits	2,404	2,683

Presumably the bulk of inventory gains must be attributable to companies, but the rise in retail prices was fairly sharp in 1948, and sole

[1] It is assumed the inventory gains in professional earnings are negligible. Inventory gains of public *authorities*, as opposed to *enterprises*, have been apparently excluded. There is no place for them in the analysis of the national income, which is defined so as to include all inventory gains. Of course a further correction needs to be made for the sharp and artificial increase in depreciation allowances, if one wants a proper picture of the change in profits.

traders must have made substantial gains out of retail stocks.[1] Consequently the 'true' profits of companies for 1948 and thus their change between 1948 and 1949 cannot be estimated with sufficient accuracy. National income analysis very urgently needs some assistance from the authorities on the division of inventory gains.

II. National Income Analysis and Economic Policy

The White Paper has become increasingly a publication for the specialist, partly because of the technical snags outlined above and partly because of the great extension of information year by year. The timing of its publication, just before the budget, suggests that it is still meant to provide the quantitative background for the debates in Parliament and amongst the public on the budget. For this political purpose it is now too indigestible.

A second function of the White Paper is that it provides a basis for education, whether formal or popular, on both the 'social framework' and the problems of post-war policy. For this purpose its uses have dwindled as its length and complexity have grown, until its educational uses are limited to the training of the university specialist, probably a post-graduate. A particular loss has been the disappearance of the 'National Income and Expenditure' table which used to show on the left-hand side the factor shares in national income and on the right the uses of the national income. This table provided most useful links between production cost, income distribution, and the end-uses of output at an elementary level.

Its third main use is to provide research workers with information from which the trends in the economy can be judged and policy assessed, and this research purpose each White Paper fulfils better than the last.

These three aims are by now mutually incompatible, and the authorities should reconsider the shape and the timing of the White Paper. The first two aims must still be fulfilled. The point, however, is that the National Income White Paper is no longer a suitable instrument. The solution clearly is to enlarge the national income section in the Economic Survey. This is the document most suitable for containing the economic background to the budget. It is also the economic White Paper most widely read and quoted and the most suitable for educational purposes.

One great advantage of this arrangement would be that it would let the National Income White Paper provide information in the form most suitable for the research worker. For example, the emphasis in the notes

[1] Since profit analysis by sector in Tables 3 and 4 excludes inventory gains, and by type of organization in other Tables includes them, one can infer a little about the official estimate of change in inventory gains (see *Bulletin, Oxford Institute of Statistics*, Oct. 1950). *The Economist*, 27 May 1950, was apparently incorrect in basing an analysis of profit movements on the assumption that all inventory gains are attributable to companies.

might change from elementary points of definition which are by now fairly familiar, to more information about how the estimates are made. Indeed we sadly lack a comprehensive statement of how the White Paper is put together. No doubt such a statement would surprise those who believe in the sanctity of official statistics, but it would also make for less over-ambitious interpretation and less surprise that estimates are adjusted so much in successive issues. Another gain would be that the National Income White Paper would no longer need to appear before the budget. The optimum time-lag is a matter for controversy, but there is a great deal to be said for revised estimates appearing some 4–6 months after the Economic Survey, by which time more raw material would be to hand.

Calendar and Financial Years

There is another point which is more important. We need to be able to move with ease backwards and forwards between the economic picture and the budget. There are two obstacles to this: the first that the Survey and the National Income White Paper refer to the *calendar* year, and the second that the 'surplus' is differently defined in different documents. The present position is that we can make a rough assessment of the inflationary or deflationary tendencies from the savings and investment account in the *Survey* (Table 13).[1] From this we conclude that the *calendar year* surplus for *all public authorities* anticipated on the basis of planned expenditure and existing tax rates needs adjusting in a certain way, and hence that the Central Government current account surplus needs a certain increase or decrease. But the vital step is to see what change in the budget surplus is necessary, and as long as that step cannot be taken the king-pin connecting fiscal policy to economic analysis is missing. The first change necessary is that at the very least the forecasts in the Economic Survey must refer to the coming financial year, particularly the forecasts of savings and investment. It is nearly as important to show the outcome of the latest financial year for the national income components. This is partly because we need to see the effect of the previous year's taxation and spending. The main reason, though, is that our present state of knowledge, and indeed the very nature of economic movements, mean that our statements about inflationary or deflationary 'gaps' must be in the form: 'To close a "gap" which is expected to be £x millions greater (or less) than last year, we must have a contribution of £y millions greater (or smaller) surplus in government accounts', instead of in the form: 'Our "gap" will be £x millions, which implies £y millions surplus.' In other words, we must think in terms of increments, of adjusting our course to the changing tide and wind, rather than of laying off a course

[1] The assessment is less rough if one discounts for official pessimism.

de novo. Any such work in increments is made much more difficult by a difference in the time periods for various data.

Estimates for a period just ended are bound to be less accurate than those for a period three months dead, but this is merely one of the special difficulties involved in the Keynesian approach to public finance. A rational budget must now take account of financial year national income estimates, and it is not unreasonable to ask that the public should also be kept well enough informed to judge the budget properly.

There is, however, an additional reason for working in financial years, and this is that it enables us to compare the *items* of government spending (such as health or military or education) against the other uses of the national product. For these reasons the estimates in the National Income White Paper would also be preferably on a financial year basis, which is indeed the basis of most of the income information. This was less true before the recent war. Then it could be argued that much of the reliable income data referred to a period slightly before the previous financial year, i.e. to *about* the previous calendar year. But with most income now being reviewed under P.A.Y.E., the original reason for working in calendar years is no longer so valid. There would, of course, be a price in loss of international comparability, but it seems on balance worth paying.[1]

The Current Account Surplus

The other change that needs to be made before we can use the modern 'social accounting' approach to its full advantage is to adopt the same current account surplus in all the major economic documents—the Economic Survey, the National Income White Paper, and the Budget. Whatever definition of central government surplus is adopted for the Survey, the Financial Statement or some supplementary statement should show what the surplus on the same definition is for the past and the current financial years (incorporating the budget proposals). This step, which would not be a difficult one for the Treasury, would be far more help in judging the overall effect of the budget on the economy than rushing the indigestible National Income White Paper into print.

The present incomparability of surpluses in different documents is a great and needless barrier to economic interpretation.[2] At present there are five in general use:

(1) The conventional surplus 'above the line'.

(2) The Revenue Account surplus in the Alternative Classification.

[1] Calendar year estimates for main components and aggregates could be supplied in addition to the financial year ones.

[2] One improvement in the latest National Income White Paper is, however, that it contains a clear reconciliation for the past between surpluses (1), (2), and (4) below (Table 32).

(3) The 'Overall' surplus.

(4) The National Income White Paper Current Account surplus (which is also contained, though not separately specified, in the Economic Survey 'Revenue Account surplus' for all public authorities).

(5) 'Public saving' (by all authorities) in the Economic Survey, which contains (4), and also the current account surplus of other public authorities, but corrects them for transfers to private capital account (though not for capital taxes), and includes public authorities' depreciation allowances.

We had hoped for some lead on this central question of the definition of the surplus from the Final Report of the (Crick) Committee on the Form of Government Accounts.[1] But this is disappointing in its handling of the reform of the Financial Statement. It was rather odd that, in view of the central place played by public finance in the attainment of the government's major economic objectives, no leading economist was appointed to the committee.

The committee quite rightly states that the Financial Statement is 'a memorandum containing a variety of material required promptly for the Budget debates', and concludes that it therefore is not the proper place for a thoroughgoing accounting record. The emphasis is on the 'promptness' necessary, but the same conclusion could also have been argued on the grounds that a budget debate is not primarily these days an accounting event; it is an economic event. The solution of the Crick Report is to let the accounting requirements of the government, subject to the time consideration, provide the classification between 'Revenue' and 'Capital', leaving the economist to 'make what re-allocations would best suit his purpose', and this is the wrong approach for a document which will be used in a primarily economic debate. It is true that the economic test, which is whether the tax (or expenditure) reduces (or augments) the purchasing power in the hand of the public, is not one capable of a precise answer, but there is enough general agreement among economists on what are, in this sense, 'Capital' items (including death duties, the Special Contribution, War Damage payments, and E.P.T. refunds) to make the margin for doubt in classification a small one. The resultant revenue 'surplus' is the one which would fit most appropriately into the savings and investment 'budget' on which economic policy ultimately rests. It would appear to be like surplus (5) above, but taxes on capital should be removed, and additions to tax reserves added to the revenue side.[2]

This would mean abandoning, or at least relegating to a minor position

[1] Cmd. 7969, especially Appendix A (the Report also recommends the use of 'key' estimates on a financial year basis, App. A, par. 16).

[2] Making it then like the item 'Total sums set aside through the action of public authorities' in National Income White Paper, Table 14, Item 6.

in the Financial Statement, a revenue account in terms of what are revenue items to the government. The implication of the whole Crick Report is, however, that it is not nearly as important for the government as for a person or company to know the extent to which it is changing its net indebtedness to the rest of the community, which is the main significance of a revenue account. Mr. Hicks has argued that we do for economic purposes need an estimate of 'Total saving arising out of central government activity', defined as above, but he maintains that the revenue account 'must be based upon criteria which arise out of the government's own transactions',[1] i.e. presumably upon the accounting criterion that 'revenue' is a receipt that does not create a liability.

There is, however, really only room in the public's consciousness for one Budget Surplus—and probably in the consciousness of M.P.s and administrators too. There is not room, at least on Budget Day, for accounting statements *and* economic statements. If the public and parliamentary debates on the economic position are to be soundly based, therefore, the revenue account, and the 'surplus', to which attention is mainly to be drawn, should be an economic account. The emphasis of the Crick Report is the wrong way round. The onus should be on the accountant to rearrange the material in the most convenient way for his purposes, except that an official 'accounting' classification might usefully be issued a little later, incidentally allowing sufficient time to make concessions to the requirements of accounting theorists. The task of popular economic education is now very largely one of shifting the emphasis in assessment of government policy from the need for an 'accounting' balance to the need for an estimate of the contribution the Government is making towards maintaining economic stability.

[1] *The Problem of Budgetary Reform*, p. 63. Mr. Hicks also advocates (p. 55) the use of financial year national income estimates as being of 'infinitely more use'.

THE QUEEN'S COLLEGE,
OXFORD.

SOME INTERNATIONAL ASPECTS OF EMPLOYMENT POLICY[1]

By T. WILSON

THE United Nations are bound by the Charter of their Organization to promote full employment, and many of them have accepted the same commitment in other statements of policy. This is a great step forward. But the trade cycle moves swiftly, events are difficult to forecast, and corrective action can be taken only experimentally and after a lapse of time. It is only realistic, therefore, to suppose that some major trading nation, however good its intentions, may fail in its efforts to fulfil its obligation and may slide into depression at least for a time. If other countries manage to avoid a sympathetic deflation, whether as a result of special corrective action or of general domestic buoyancy, their balances of payments are bound to suffer. If their reserves are not large, worst of all if the decline in exports to the depressed country merely accentuates a scarcity of currency which has already been apparent before the depression, drastic action of some kind will have to be taken. Imports may, of course, be reduced by following their neighbour into depression, but on the assumption that this course must, if possible, be avoided, it may be said that the appropriate remedies fall into two broad groups. First, a number of measures may be taken to close the deficits in foreign payments by restricting imports and, if possible, by stimulating exports. Second, the deficits may be allowed to continue, and some means of financing them devised.

These two groups are not mutually exclusive, and no doubt resort would be had in practice to some of both. It will be argued, however, in the following paragraphs that the second set of alternatives, if at all feasible, is to be preferred, a conclusion which is in sympathy with the views of the group of experts who recently prepared a report for the United Nations on *National and International Measures for Full Employment*. The practical methods of achieving this objective will then be discussed, and I shall examine in some detail the proposals for adding to the functions of the International Monetary Fund which are contained in this important United Nations document. Unfortunately these specific recommendations are open to serious criticism and appear to be unacceptable both for technical and political reasons. I shall try to show, however, that in spite of the

[1] The substance of this article was contained in a report prepared for a private international organization about three years ago. In the present article, however, I also discuss some parts of the United Nations Report on *National and International Measures for Full Employment*. The basic propositions put forward in the latter document are similar in some respects, but the practical recommendations are different.

general uneasiness about the adequacy of existing international institutions to meet a crisis of the kind envisaged, the Articles of Agreement of the Fund do, in fact, provide more scope for effective action than is usually recognized, which may be a fact of some importance if a crisis should occur before any institutional change has been made. The desirability of some change must, however, be conceded and some suggestions will be made towards the end of the article.

II. Let us begin by considering possible methods of closing the deficits in the balances of payments of the countries which had so far escaped internal depression, if not completely, at all events to a sufficient extent to have left them out of alinement with the country in which the slump had occurred. One not very promising measure would be the devaluation of their currencies relatively to that of the surplus country. Whether the International Monetary Fund would sanction this step is not altogether certain. It will be recalled that a change of parities of any magnitude may be permitted at the discretion of the Fund in order to correct a 'fundamental disequilibrium'; and everything depends upon the interpretation of the latter term. At all events it seems that the Fund would not give its blessing to any depreciation of the currency of the surplus country—and that, perhaps, is something.[1] In practice, of course, the Fund might be able to exercise little or no effective control and all kinds of changes might take place. But, apart from questions of legality, it is not at all certain that the deficit countries would gain on balance from depreciation at such a time even if there were no danger of retaliation. They would probably sell a little more to the depressed country, and, more important, they would probably trade more with each other and thus reduce their imports from the scarce-currency area. But it is unlikely that the elasticity of supply would be so great in the short run as to justify such action; and if the whole process would have to be reversed when the depressed country had recovered, it would not in any case be sensible to make elaborate structural changes. The governing consideration should not, I suspect, be the influence of depreciation on the balance of payments on current account, but rather its effect on the international transfer of capital. If it were the publicly declared policy to adjust rates at such a time, a flight of capital would undoubtedly begin and might itself necessitate a precipitous adjustment of parities of highly dubious magnitude before the effect of the

[1] In 1933–4 the U.S. dollar was devalued by as much as two-fifths, although this was not required to remove any shortage of foreign exchange. Possibly the Fund would frown on any similar action in the future, but it must be borne in mind that the devaluation of the dollar in terms of gold was not necessarily wrong in the thirties, and might well be desirable in the future. Unfortunately in 1933–4 the dollar was lowered relatively to other currencies as well. Further adjustments of other currencies in terms of gold were then, perhaps, appropriate, but would have been difficult to effect in an orderly manner in the circumstances of the time.

developing slump on current transactions could possibly be estimated. A publicly declared policy of exchange stability throughout the crisis would have much to commend it—provided there was sufficient public confidence in its feasibility. If such confidence were lacking, however, and could not be built up, it might be wiser to make a change in parities early rather than late. It seems impossible to discuss what should be done without hedging one's remarks almost to the point of absurdity! But one thing does seem clear: it is the expected effect on capital movements which should be the main consideration.

Apart from depreciation, the deficit countries could try to check the drain on their reserves by the quantitative restriction of imports. If controls were in use before the crisis, it would merely be a question of applying them with greater severity. If most controls had already been abandoned, their restoration might be sanctioned by the relevant international authorities: the Fund might permit the use of exchange control (Article VII); the International Trade Organization—if it had come into being—might agree to the use of discriminatory import controls (I.T.C., Art. 23, para. 5 (*a*)). Indeed, if no other solution were offered, such restrictions would have to be imposed, whether sanctioned or not, unless the deficit countries were prepared to deflate on a sufficiently drastic scale. The drain on reserves could no doubt be checked in the end by such measures, but the consequences would scarcely be altogether pleasant. The inelasticity of supply, which would reduce the efficacy of depreciation, would also hamper the use of direct controls. The standard of living would suffer and the level of employment itself might fall for a new reason, a shortage of imported raw materials. Nor would the effect be merely transitory, for an experience of this kind would strengthen enormously the case for greater autarky in the long run as a protection against such cyclical disasters.

Presumably some restriction of imports must be anticipated in the circumstances we have in mind, but it is surely preferable to seek some tolerable means of financing the cyclical deficits while they last. Apart from long-run considerations, such a policy would clearly be to the immediate advantage of the surplus country itself. If other countries were not assisted with an adequate supply of its currency, it would be faced with the grim alternative of discriminatory restrictions directed against its imports which would intensify the depression at home as well as weaken its future position as a trading nation.

III. A surplus country which wanted to assist its neighbours could do so, of course, in all kinds of ways. An increase in foreign lending is one which is usually mentioned; and if private funds were slow in coming, public funds, or the public guarantee of private loans, could swell the flow to more substantial proportions. Special efforts might also, of course, be

made by the International Bank. It may be reasonable to anticipate a sufficient increase in lending to ease the position appreciably, but it would probably be unwise to hope that this would suffice. After all, it would not merely be a question of finding the money. Sound projects would have to be discovered, and investment, whether domestic or foreign, cannot be turned off and on, as though by a tap, with no regard for anything except stability. It is probable that a substantial part of the necessary funds would have to be provided on a special basis, and it is of interest to note that Professor Viner—whose views can scarcely be dismissed as those of a monetary crank—has proposed the creation of an Employment Stabilization Fund which would 'lend at critical times to the most suitable applicants, however poor credit risks they might be, to the extent necessary to get its funds into operation'.[1] The authors of the United Nations Report, mentioned above, propose both the stabilization of international investment and the reform of the International Monetary Fund. It is with the latter recommendation that we shall be mainly concerned.

The proposals of the committee may be summarized, rather baldly, as follows:[2]

(*a*) A reference year of full employment is to be chosen.

(*b*) 'If, in any given year, the value of imports of goods and services by a particular country falls as a result of a fall in effective demand within the country, and this fall is not fully offset by a decline in the value of its current exports of goods and services, that country (hereinafter referred to as "the depositor country") should make a deposit in its own currency with the International Monetary Fund of an amount equal to the fall in its imports less the fall in its exports in the given year, as compared with the reference year. . . .'

(*c*) 'The International Monetary Fund should be empowered to waive the deposit requirements under (*b*) above if the country concerned can show, to the satisfaction of the Fund, that the fall in its external currency disbursements on current account was due in part or in whole to factors other than a reduction in its import demand caused by a fall in effective demand within the country or other than a restriction of imports that was not made necessary by an adverse balance of payments.'

(*d*) 'The International Monetary Fund should be empowered to sell the currency of the depositor country, made available to it in accordance with the provisions of (*b*) above, against the currencies of member and non-member countries. . . . Purchasing countries should be entitled to buy the currency of a depositor country in an amount not exceeding the fall in the value of their exports to, less the fall in the value of their imports from, the depositor country, as compared with the reference year. . . .'

(*e*) 'The currencies of purchasing countries received by the International Monetary Fund in accordance with the provisions of (*d*) above should be deposited to the credit of the depositor country concerned. These deposits should be made freely available for the finance of current transactions of the depositor country in subsequent periods, to the extent to which its own monetary reserves are diminishing. . . .'

[1] *Lloyds Bank Review*, October 1946.

[2] The quotations are from pp. 96–9 of the Report.

In principle, the scheme is attractive. A country which fails to maintain its monetary expenditure at a satisfactory level is clearly responsible for disrupting the course of foreign trade, and it may reasonably be asked to do what it can to minimize the disturbance. It is perhaps the principal merit of this section of the Report that it reminds the United Nations of their obligations in a firm, uncompromising way. Yet it is clear that its detailed provisions will not, and perhaps should not, be accepted.

To begin with, the choice of the reference year would be a very difficult and controversial matter. It is not as though we could anticipate a convenient period of steady progress, with everything in some kind of dynamic equilibrium, before the onset of the crisis. Every year will be thought abnormal for one reason or another, and there will always be sufficient traces of inflation or deflation in various countries to give rise to dispute and uncertainty. Still more difficult, how would the effect of cyclical changes be distinguished from other effects and estimated separately in the manner anticipated in (*c*) above? And when a depression had begun elsewhere, would the monetary authorities in the deficit countries have sufficient nerve and sufficient confidence in the scheme to watch their reserves dwindle for a year or so before the compensatory payments began? And so on. There is no need to add further to the list of snags, for it is already clear, in any case, that the scheme stands no chance of being accepted. The major trading nations, in particular the United States, will not be prepared to promise in advance to act according to a rigid plan of the kind suggested.

If the scheme is too ambitious in these aspects, in another it is too modest. For even if it were in operation it would probably not give adequate protection to the deficit countries. A cyclical crisis of the kind envisaged will do more than affect imports and exports; it will also cause some international transfers of capital, and these may well have as devastating an effect on reserves as has the adverse balance of payments on current account. The importance of such flights of capital was painfully obvious in the thirties, and although exchange control should now be some sort of check, recent experience shows that large sums can still get through.[1] No doubt the incentive to make such transfers would be less if the committee's scheme were in force; given time, the deterioration in the current account would then be halted fairly well, and the fear of devaluation, in such circumstances, would presumably be less acute. But it would be rash to act on the assumption that the confidence generated in this way would be so strong as to reduce capital transfers to a modest flow.

[1] In a private communication Mr. G. D. A. MacDougall has shown that compensatory payments which the sterling area would have received under the plan in respect of the year 1949 would have amounted to only a modest fraction of the actual loss of gold and dollar reserves before devaluation.

What is the upshot of the argument so far? It is surely that both for political and technical reasons a scheme which provides for automatic compensation, according to a fairly precise formula, cannot be regarded as feasible. Yet the basic proposition from which the committee started was sound: the currency of a depressed country should be prevented somehow or other from becoming so scarce as to drag other countries into depression as well. If the objective is to be achieved without the adoption of an elaborate plan of the kind suggested, it will be necessary to rely upon specific measures to be adopted when the crisis occurs.

This may appear to be a discouraging conclusion. The arguments in favour of an agreed plan are strong, and it will certainly be unfortunate if countries are left indefinitely with nothing more than the hope that someone will do something every time the position becomes critical. But it is surely possible to find a compromise between an elaborate plan and no commitment at all. What is needed is a new pledge which will bind each nation to adopt whatever measures appear to be appropriate at the time in order to prevent its currency from becoming scarce. The vagueness of such a pledge increases enormously its chance of acceptance, and, in other respects, this vagueness may seem less of a defect if it is recalled that the precision of an elaborate formula may be largely deceptive anyway. Indeed, there is much to be said, on general grounds, for leaving the commitment loosely defined. In the event, the calculation of the amount of assistance required should, of course, take account of the cyclical changes in exports and imports which are stressed in the United Nations Report; but other considerations should also influence the decision, such as capital movements, unsound financial policies in the deficit countries, the effects of stock-piling and of increased long-term lending, and the like. Naturally a number of guesses would have to be made, and in all probability there would be a tendency to do too little rather than too much. But some reliance can be placed on ordinary reserves, and it must also be recognized that other countries can scarcely expect to insulate themselves completely from the 'foreign-trade multiplier'. To some extent—and this is cold comfort—the depression is bound to spread internationally with a consequent easing of the pressure on balances of payments. (Admittedly, if other nations are suffering from inflation, the 'multiplier' effect of a fall in exports on domestic demand may not be so great as to restrict appreciably their markets for imports, which will already be regulated by direct controls. But, in such circumstances, it may be held that the deficit countries should bear part of the burden of adjustment.)

It need scarcely be said that the effective implementation of the pledge would require enlightened self-interest, if not goodwill, all round; but this condition is no less necessary for the scheme in the United Nations Report.

After all, a country which refuses to commit itself in advance, especially at a time when the immediate danger is inflation, to the acceptance of a formula for dealing with deflation may nevertheless accept a more general pledge which leaves it greater discretion, and subsequently, when the crisis is upon it, it may adopt a really forthcoming policy rather than allow the domestic depression to be accentuated by a fall in exports.

IV. So much for the pledge. The next step is to examine the institutional machinery which could be used in implementing it. On the whole, I think it would be desirable to make some changes in the constitution of the Fund; but first of all I shall try to show that, even in its present form, the Fund could, if necessary, be used as a channel for disbursements.

To begin with Article VII. In the past, too much attention has, perhaps, been devoted to section 3 of this Article, which (*a*) provides for the rationing by the Fund of a currency which it has declared scarce, and (*b*) allows any member 'to impose limitations on the freedom of exchange operations in the scarce currency'. This concession under (*b*) may well be of no particular value at least for a considerable time ahead; for it is only realistic to suppose that exchange control will be in force in any case. The interesting question is not whether exchange control could be used, but whether some less harmful method than a severe restriction of imports could be devised. An alternative is in fact provided under section 2 of the same article: the Fund may try to replenish its holdings of a scarce currency by borrowing from the member concerned. It may:

> 'Propose to the member that, on terms and conditions agreed between the Fund and the member, the latter lend its currency to the Fund. . . .'

The next step is to see how this money can be passed on to the countries which need it. In Article V, section 3, the normal conditions governing the use of the Fund's resources are laid down. In particular, a proposed purchase of currency must not cause 'the Fund's holdings of the purchasing member's currency to increase by more than twenty-five per cent. of its quota during the period of twelve months ending on the date of the purchase nor to exceed two hundred per cent. of its quota. . . .' In the circumstances we are considering, some countries might well have exhausted their borrowing rights, either wholly or at least for the time being, and, if so, the provision of additional supplies of the scarce currency to the Fund would be of no help to them. A possible solution would be to increase the amounts which might be borrowed by invoking section 4 of the Article:

> 'The Fund may in its discretion, and on terms which safeguard its interests, waive any of the conditions prescribed in section 3 (*a*) of this Article. . . .'

If the deficit countries were to be saddled with a heavy burden of amortization payments and interest charges, the wisdom of adopting the measures described above might well be doubted. Fortunately, this danger could be

avoided; everything would depend upon the special arrangements made at the time. In allowing countries to borrow in excess of what would normally be allowed the Fund would have to 'safeguard its interests' (Art. V, section 4), and what this would imply would be governed by the terms upon which the Fund itself had acquired its additional supplies of the scarce currency. These terms, in turn, are not laid down in advance in the Articles of Agreement. If the surplus country were generous in its treatment of the Fund, the latter could deal generously with the borrowing countries. That is the crux of the matter. Amortization could be fast or slow, and even the ordinary interest charges on loans could be changed by a three-fourths majority of the total voting power (Art. V, section 8 (*e*)). The uniform service charge is a different matter (Art. V, section 8 (*a*)); there is, I think, no provision for reducing it below one-half per cent., but at that level it would scarcely be a grievous burden.

If the Fund is to accept some responsibility for anti-cyclical policies, this must not be allowed to prejudice the performance of its more normal functions. The United Nations Report mentions this point, but the proposals are not related explicitly to the Articles of Agreement, and it may be assumed that the further task of detailed reconciliation had to be postponed. (The document, which was urgently demanded, was written in a mere seven weeks.) The proposals made above in the preceding section simply require for their implementation the use of some special clauses in the constitution, but it is doubtful whether matters should be left permanently on this basis. The clumsy manœuvres necessary to regulate interest charges may be cited as an example. Ordinary rates would be charged on funds borrowed before the crisis. The funds supplied during the crisis for purposes of stabilization should, however, be obtained at lower rates which would imply a revision of Article V, section 8 (*c*), by a three-quarters majority. Subsequently the normal rates should be charged on loans made after the crisis, and for this purpose Article V would have to be altered again!

It would surely be more desirable to separate the different functions of the Fund. A new department should be set up, analogous to Professor Viner's Stabilization Fund, which would handle any funds specially obtained for cyclical purposes. No member would be under an obligation to lend this department any specified amount, but all would be committed by the general pledge to co-operate with it and to consider its requests. The terms on which it could borrow would be settled when the occasion arose, and these, in turn, would determine the conditions on which it could lend. There would be no question, however, of attempting to stabilize payments on some predetermined basis every year in the manner apparently envisaged by the authors of the United Nations Report. Action would be

taken only when the position appeared to be really critical; but, in such circumstances, the new department would try to obtain funds and to make disbursements as soon as possible, instead of allowing a full year or more to elapse before compensatory payments began. Nor should this new section be obliged to wait until a currency had become scarce in the other part of the Fund before it could begin to operate. Its object would rather be to prevent currencies from becoming scarce in this way and thus to permit the other section to operate as far as possible on a normal basis without invoking escape clauses such as those contained in Article VII. Naturally each department would be affected by the operation of the other and close co-operation would be required.

What I have proposed is, first, a new international pledge to supplement the existing pledge in the Charter of the United Nations, and, second, a reorganization of the International Monetary Fund. These proposals do not involve precise commitments and are far more modest than those made in the United Nations Report. Yet it is most improbable that any fresh measures will be adopted in the near future, and the experience of another crisis will probably be needed as a stimulus before the machinery is reconstructed on a permanent basis. This may not, however, be such a gloomy conclusion. If a slump occurred, the will to act would probably not be lacking, and, apart from all kinds of entirely *ad hoc* expedients, resort could be had, as we have seen, to the special clauses in the Articles of Agreement of the Fund. These clauses could be made to serve for the time being, however desirable it might be to carry out some institutional reform at a later date.

UNIVERSITY COLLEGE,
OXFORD

A NOTE ON THE CYCLICAL FLUCTUATIONS OF BRITISH HOME INVESTMENT, 1870–1913[1]

By J. S. PESMAZOGLU

1. A note on J. Tinbergen's *A Method and its Application to Investment Activity*, League of Nations, Geneva, 1939

THE theoretical economic assumptions on which Tinbergen's work on the cyclical fluctuations of investment activity in a number of countries is based are as follows:[2]

A. The quantity of investment goods deliveries at any moment is determined by entrepreneurial decisions taken at an earlier moment. This time-lag depends on the average length of the period of production of investment goods, which is increased by an additional short lapse of time, necessary for the various changing factors to exert their influence on business decisions.

B. Private investment decisions are determined by the marginal prospective yield, i.e. by the expected marginal rate of net return from capital goods over their replacement costs, relative to the current and expected rate of interest. In the case of investment activity in the United Kingdom Tinbergen has used the level of current non-labour net private money income at any moment as a good approximation to the marginal prospective rate of profit at this particular moment. But this approximation is based on a set of additional assumptions: first, that non-labour income is subject to cyclical movements parallel—i.e. coincident and of proportional amplitude—to the variations of net profits after deductions are made for rent and interest-rate payments. Second, that expectations about future profits are highly influenced by current profits. Third, that changes in the total stock of real capital are insignificant owing to the small proportion of net additions to the total stock of capital. Changes in the marginal efficiency of capital are therefore considered as being primarily influenced by changes in realized profits.

C. In addition to non-labour income, prices of investment goods, and long-term rates of interest, the following explanatory variates are also usually introduced in Tinbergen's analytical models: the short-term rate

[1] I wish to express my sincere thanks to Mr. R. Stone, Dr. G. Orcutt, Dr. D. Cochrane, and Prof. J. Tinbergen for most helpful criticisms and suggestions. I am particularly indebted to Prof. J. Tinbergen for his very kind permission to use part of the statistical material contained in his unpublished work on 'Business Cycles in the U.K., 1870–1914'.

[2] J. Tinbergen, *A Method and its Application to Investment Activity*, 1939, pp. 34–42. Subsequent studies by J. Tinbergen are also based on the theoretical background developed in the pages mentioned above.

of interest, representing the ease with which funds can be borrowed, and share-prices as indicating fluctuations in the state of confidence.

One of the main difficulties with this theoretical background is the acceptance of fluctuations in non-labour income as a good approximation to variations in the marginal prospective rate of profits. More particularly the assumption of 'smooth movements of the total capital stock',[1] on which this approximation rests, is contrary to the factor which trade-cycle analysis has again emphasized in recent years, namely, the effects on the variations of the marginal efficiency of capital of the accumulation and decumulation of the stock of capital during the trade-cycle.[2] Further, it allows no room for the theories which attempt to explain the trade-cycle as a pure investment, or reinvestment cycle,[3] or by psychological or expectational factors[4] which may not be sufficiently reflected in variations of share-prices.

The introduction of profit rates measured by the average ratio of distributed profits to paid-up capital,[5] when such series are available, does not substantially diminish our difficulties. If profits influence investment decisions, then surely it is aggregate net profits and not only distributed profits which have such an effect, while the exact relation between distributed and aggregate net profits has yet to be examined. Moreover, even if variations in distributed profits are a good indication of fluctuations in aggregate net profits, the ratio of total net profits to paid-up capital is not an adequate measure of the marginal (prospective) rate of profit which, apart from expected aggregate net profits and the current price-level of investment goods, is influenced by the size (and composition) of the stock of capital goods.

The main feature of Tinbergen's pioneering work consists, perhaps, in the application of multiple correlation technique for the purpose of obtaining some information on the relative importance of the factors influencing investment activity. There are, however, some doubts as to the reliability of his results derived from regression equations in which the variates —in the form of the original data, or in their deviations from a trend of low degree, or a moving average—are probably of a highly systematic character. The estimates of the coefficients are of uncertain precision,

[1] J. Tinbergen, *A Method and its Application*, p. 37, and 'A Reply', *Economic Journal*, March 1940, p. 146.

[2] Cf. J. Robinson, *Introduction to the Theory of Employment*, 1947, pp. 91–2; M. Kalecki, *Essays in the Theory of Economic Fluctuations*, 1938, p. 146.

[3] See in G. Haberler's *Prosperity and Depression*, 1946, pp. 73–85, certain theories of the group of non-monetary over-investment theories.

[4] Certain psychological theories for instance (see G. Haberler, op. cit., ch. 6), as e.g. of the type recently developed by G. L. S. Shackle, *Expectations, Investment and Income*, 1938. See also below, p. 59.

[5] J. Tinbergen, *A Method and its Application*, p. 37.

since the residual (error) term of such regressions will most likely be highly positively autocorrelated.[1] Expressions of the form of Tinbergen's equations may perhaps indicate relationships between levels, but they are probably inadequate for measurements of correlations between the short-term changes in the relevant series. Hence, regressions calculated from the original (annual) data, or from their deviations from a linear trend or a moving average, may be helpful for certain predictive purposes; but they are not very useful for an explanatory analysis of the type required in testing business-cycle theories, the aim of which is the investigation of the relative importance of various factors in determining short-term movements.

2. M. Kalecki's trade-cycle model; an application to cyclical fluctuations of British home investment, 1870-1913

M. Kalecki in his *Studies in Economic Dynamics* has constructed a model for the fluctuations of investment decisions which can be expressed in the following relation: the rate of change of the flow of capital goods for net investment in a unit period of time over the flow during the preceding time-unit is positively correlated with the rate of change of net real profits and negatively correlated with the volume of net investment, both independent variates being taken with a time-lag of a magnitude $\omega+\theta$, where θ is the average period of production of investment goods and ω the additional short lapse of time necessary for the various phenomena to influence entrepreneurial decisions. If I_v represents the volume of net investment, P aggregate net money profits, and p_i prices of investment goods, a linear expression of Kalecki's model is given by the following equation:[2]

$$I_{v_{t+\omega+\theta}} - I_{v_t} = a_1 \frac{dP}{dt} - a_2 \frac{dp_i}{dt} - (b+c) I_{v_t}.$$

The parameters[3] a_1 and $-a_2$ are measures of the influence of profits and prices, respectively, on investment decisions. The coefficient of I_{v_t} is the sum of two terms $b+c$, of which b stands for the direct influence of variations in the stock of real capital on the marginal efficiency of capital, while c is a decreasing function of a factor representing the limitations set to entrepreneurial decisions, when investment is expanding, which are due to increasing risk and imperfect competition.[4]

But, in addition to the variables contained in the above equation, the marginal efficiency of capital is influenced by variations in expectations,

[1] For a recent detailed exposition of these difficulties see D. Cochrane and G. Orcutt, 'Application of Least Squares Regression to Relationships containing Autocorrelated Error Terms', *Journal of the American Statistical Association*, March 1949, pp. 36 ff.

[2] Cf. M. Kalecki, *Studies in Economic Dynamics*, 1943, p. 67.

[3] The signs of the parameters reflect the positive or negative values which we would theoretically expect.

[4] See M. Kalecki, *Studies in Economic Dynamics*, pp. 64–5.

for which good indicators may be found in changes of share-prices at home and abroad. Moreover, investment decisions are affected by variations in the long-term rate of interest.[1] If we express by n, n_a, and m share-prices at home, a composite index of share-prices abroad, and the long-term rate of interest, respectively, the preceding equation can be written in a more general form as follows:

$$I_{v_{t+\omega+\theta}} - I_{v_t} = a_1 \frac{dP}{dt} - a_2 \frac{dp_i}{dt} - (b+c) I_{v_t} + a_3 \frac{dn}{dt} - a_4 \frac{dm}{dt} + a_5 \frac{dn_a}{dt},$$

where a_3, a_5, and $-a_4$ are measures of the influence of the three additional variables, respectively.

A calculation of a regression equation in the above form was attempted for British home investment between 1870 and 1913. The difficulties which may arise from the presence of autoregressive properties in the residual terms of the regressions were reduced by introducing all the variates, with the exception of one, in the form of first differences of the original data.[2]

A. The statistical material

An index of the volume of British gross home investment (I_v), with base year 1907, was obtained from a series of values of British gross home investment at 1907 prices calculated by Tinbergen and presented in his unpublished work on 'Business Cycles in the U.K., 1870–1914'.[3]

An index of prices of investment goods in the United Kingdom (p_i) was also found in the material contained in the above unpublished work by Tinbergen.[4]

[1] Private investment decisions are assumed to be primarily influenced by the long-term rate of interest. Even if the investment projects were carried on the basis of provisional short-term borrowing, the decisions to undertake the schemes would surely be linked to the (current and expected) long-term rate. In addition, despite differences in amplitude the pattern and timing of the cyclical movements of the two series are found to be fairly close. For the analysis in this essay the omission of the short-term rate, as a separate explanatory variate, is more justified in view of the greater part of British home investment being during this period probably self-financed. Cf. also J. Tinbergen's findings, in section 3 below.

[2] The application of the first difference transformation of the time series for reducing these difficulties is suggested by G. Orcutt and D. Cochrane, op. cit., pp. 53 ff.

[3] The following method of calculation was applied by Tinbergen: the two constituent items of gross home investment were assumed to be the gross output of machinery and building. The two constituent series were extrapolated on the basis of Sir Alfred Flux's estimates in the Report of the Census of Production of 1907 of the values of the gross output of the metal and building industries in 1907, and with the help of Cairncross's series of consumption of iron and steel for home purposes, and of the two-year moving average of imports of wood and timber, respectively. J. Tinbergen, 'Business Cycles in the U.K., 1870–1914' (unpublished), Table 1 c.

[4] This index was estimated by Tinbergen as follows: a series of prices of machinery was calculated with the help of an equation relating prices of machinery to prices of pig-iron. The series of prices of exports of investment goods (calculated by deflating a series of values of exports of investment goods by the respective export volumes) was then adjusted in order to obtain a series of prices of home investment goods. J. Tinbergen, 'Business Cycles in the U.K., 1870–1914', ch. I.

A series of net profits (P) containing all profit components which one would expect to exert a direct influence on home-investment decisions was derived from A. R. Prest's figures.[1] Prest's estimates of profits are based on the British income-tax returns,[2] and careful adjustments were made for the methods of assessment used by the tax authorities and the timing of the series. But it was thought necessary to deduct from Prest's total profits the 'identifiable' (in the income-tax returns) income from foreign investments, i.e. mainly the annual earnings from coupons of foreign securities.[3] It was considered that such income, as opposed to the 'unidentifiable' income from foreign investments accruing mainly to firms and undertakings from branch offices and businesses operating abroad, was unlikely to affect directly decisions to invest at home.[4]

The series of profits (P) which was derived in this way from Prest's 'net profits' is different from Tinbergen's non-labour income (Z) which was based on Bowley's figures and was used as an approximation to net money profits in the analysis of business cycles in the United Kingdom. The cyclical turning-points of the two series are fairly coincident, but the amplitudes of the absolute and percentage fluctuations of our series is greater than Tinbergen's. The two series are related in the following way:

(Annual changes of our series of Profits) $= -0{\cdot}42+1{\cdot}48$ (Annual changes of Tinbergen's series), with $r = 0{\cdot}74$.

For long-term interest rates (m) the yield on British consols[5] was used.

An index of share-prices in the United Kingdom (n) was obtained from Memorandum 37 of the London and Cambridge Economic Service.[6]

Finally, a composite index of share-prices abroad (n_a) was constructed on the basis of share-price indices in the major industrial countries, namely, France, U.S.A., and Germany, taken with equal weights.[7]

[1] A. R. Prest, 'National Income of the United Kingdom, 1870–1913', *Econ. Journ.*, March 1948, p. 57.

[2] Schedules A–E.

[3] These amounts are easily obtainable from C. K. Hobson, *The Export of Capital*, 1914, pp. 200–1.

[4] A further deduction of the incomes assessed under Schedule E (salaries of government corporations and public company officials) was not thought necessary. The size of this component was relatively small and showed only a trend movement. A small part of the identifiable income from foreign investments accruing to intermediate income earners was included in the figures which we deducted from Prest's series, and this probably offset the upward bias of our series due to the inclusion of Schedule E. No further adjustment of Prest's series was thought necessary, since all other items assessed under Schedules A–E could have directly influenced the decisions to invest in real capital at home.

[5] I. Fisher, *The Theory of Interest*, Table XII, p. 530; see J. Tinbergen, *A Method and its Application*, Appendix B, p. 149.

[6] K. C. Smith and G. F. Horne, *An Index Number of Securities, 1867–1913*, London and Cambridge Economic Service, Special Memorandum 37, June 1934, p. 4.

[7] The indices for the particular countries were obtained from J. Tinbergen, *A Method and its Application*, Appendix B, pp. 150, 152, 153. An index reflecting changes in the level of activity in the countries which were the main borrowers and importers from the U.K. would probably have been more adequate. But the difficulties of constructing a reliable index of share-prices representing British interests abroad were found to be too great.

All series were reduced to index numbers with base year 1907, with the exception of the rates of interest which were left in annual percentage rates.

The first differences (indicated hereafter by the abbreviation 'F.D.') are signified by a dot on the symbol of the respective variate. The Greek letter ι with the suffix v (ι_v) stands for the absolute deviations of the index of British gross home investment (I_v) from its 9-year moving average.

B. The statistical treatment of the data

Assuming firstly that replacement and repairs in order to 'keep capital intact' show only a trend movement parallel to the trend movement of gross home investment, the deviations of the investment series from its 9-year moving average will be highly associated with the cyclical fluctuations of the volume of net investment. Further, on the assumption that annual changes in our time series are approximately linear, their F.D. may be taken as an approximation to the derivatives of each variate with respect to time. Since on these assumptions the 9-year moving average of our series of gross home investment was approximately linear, the F.D. of the series of gross home investment are a good approximation to annual changes in net investment.

Movements in the prices of investment goods (p_i) and share-prices abroad (n_a) are highly associated with variations of net profits in the United Kingdom. Therefore, measuring in F.D., the influence of the latter variate was eliminated from the former variates, and only the residuals of the prices of investment goods and share-prices abroad were introduced in our regression. Similarly, share-prices at home (n) are highly correlated with profits and the long-term rate of interest (m). Therefore, measuring in F.D., the influence of the latter variates was also eliminated, and only the residuals of the share-prices were introduced. The residual F.D. of share-prices were of course due to expectations about the future course of business conditions and to speculative influences which tend to amplify the effects of changes in profits and interest rates in the course of the trade-cycle. In all of these cases the notation used for the residual F.D. is a bracket with the letter e and the symbol (or symbols) of the variate (or variates) whose influence has been eliminated.[1]

Finally, the lag with which the values of the explanatory variates were introduced relative to the dependent variate was decided after successive experiments. The regression of $\dot{I}_v$ on $\dot{P}$, $\dot{p}_i$, and ι_v was calculated with the three explanatory variates being taken with a lag of half a year[2] behind the

[1] Thus the residual F.D. for share-prices after elimination of the F.D. of aggregate profits and of the F.D. of interest rates would be $\dot{n}(e\dot{p}_{\dot{m}})$.

[2] The series lagged by half a year were linearly interpolated from the original annual data.

dependent variate. But the multiple correlation coefficient obtained was too low, and the sign of the regression coefficient of ι_v was positive while theoretically we should expect it to be negative. We then introduced ι_v with one year's lag, while retaining the other two variates with a lag of half a year. Although the signs of the coefficients corresponded to our *a priori* considerations, the fit was only slightly improved. We then lagged all variates by one year, and since the results were more satisfactory this lag was finally adopted. A lag of one year was also found by Tinbergen, and Kalecki considers one year to be the order of magnitude of $\omega+\theta$.[1] The lag of one year with which the explanatory variates are introduced in our regression is signified in our symbols by the suffix -1.

C. Analysis of results

Table I presents the coefficients of the multiple regressions of the F.D. of British gross home investment ($\dot{I}_v$ variate 1) on combinations of the following explanatory variates, all introduced with one year's lag relative to the dependent variate:

Description of explanatory variate	*Symbol*	*Number*
F.D. of aggregate net profits	$\dot{P}_{-1}$	2
Residual F.D. of prices of investment goods after the influence of $\dot{P}$ has been eliminated	$\dot{p}_i(e_{\dot{P}})_{-1}$	3
Absolute deviations of British gross home investment (I_v) from its 9-year moving average	ι_{v-1}	4
Residual F.D. of the index of share-prices in the U.K. after the influence of the F.D. of profits ($\dot{P}$) and of long-term interest rates ($\dot{m}$) has been eliminated	$\dot{n}(e_{\dot{P}\dot{m}})_{-1}$	5
F.D. of long-term interest rates	$\dot{m}$	6
Residual F.D. of share-prices abroad after the influence of the F.D. of profits ($\dot{P}$) has been eliminated	$\dot{n}_a(e_{\dot{P}})_{-1}$	7

The matrix of zero-order correlation coefficients in the set (123456) is

$$\begin{bmatrix} 1{\cdot}0000 & -0{\cdot}0879 & -0{\cdot}1518 & -0{\cdot}4820 & 0{\cdot}4210 & 0{\cdot}3261 \\ & 1{\cdot}0000 & 0{\cdot}0004 & 0{\cdot}4168 & 0{\cdot}0029 & 0{\cdot}2001 \\ & & 1{\cdot}0000 & 0{\cdot}2174 & 0{\cdot}0514 & 0{\cdot}4104 \\ & & & 1{\cdot}0000 & -0{\cdot}1039 & 0{\cdot}2223 \\ & & & & 1{\cdot}0000 & 0{\cdot}4159 \\ & & & & & 1{\cdot}0000 \end{bmatrix}$$

From the bunch maps[2] presented in Chart 1 it may be seen that when variate 3 is added to the set (1245) the bunches explode, which indicates

[1] See above, p. 41. J. Tinbergen, *A Method and its Application*, p. 48; M. Kalecki, *Studies in Economic Dynamics*, p. 67.

[2] For an exposition of the bunch map analysis see R. Frisch, *Statistical Confluence Analysis by Means of Complete Regression Systems*, 1934, Part III; J. Tinbergen, *A Method and its Application*, pp. 30–2, and pp. 138–43; R. Stone, 'The Analysis of Market Demand', *Journal of the Royal Statistical Society*, Parts III–IV, 1945, pp. 306–10.

that the set (12345) is affected by multicollinearity. It may also be observed that the lengths of the beams of variate 3 when added to the set (1245) are much shorter than those of variates 4 and 5 which would indicate that the relative importance of variate 3 is probably rather low. Similarly from Chart 1 we observe that when variate 6 is added to any of the sets (15), (124), (125), (145), or (1245) the bunches explode, which indicates that variate 6 when added to the above sets is 'detrimental'.[1]

TABLE I

'Explanation' of the Annual Changes of the Volume of British Home Investment, 1877–1909

Symbol	*Coefficients of multiple regressions of* $\dot{I}_v$ (variate 1) *on combinations of the following explanatory variates:*							
	$\dot{P}_{-1}$	$\dot{p}_i(e\dot{P})_{-1}$	ι_{v-1}	$\dot{n}(e\dot{P}\dot{m})_{-1}$	$\dot{m}_{-1}$	$\dot{n}_o(e\dot{P})_{-1}$	R	$\bar{R}$
Number	2	3	4	5	6	7		
Equation 1	0·13	..	−0·50	0·33	..	..	0·62	0·56
2	0·13	−0·05	−0·49	0·33	..	..	0·62	0·54
3	0·15	..	−0·49	0·29	−6·27	..	0·63	0·56
4	0·13	..	−0·49	0·31	..	0·05	0·62	0·54
5	..	..	−0·45 (±0·15)	0·33 (±0·13)	..	..	0·61	0·57
Coefficients of partial correlation (equation 2)	0·13 (±0·18)	..	−0·49 (±0·14)	0·42 (±0·15)	..	..	..	..

Meaning of symbols

I_v = volume of gross home investment; $\dot{I}_v$ = F.D. of I_v; $\dot{P}$ = F.D. of aggregate net money profits (P); $\dot{p}_i(e\dot{P})$ = residual F.D. of prices of investment goods after elimination of the influence of $\dot{P}$; ι_v = absolute deviations of I_v from its 9-year moving average; $\dot{n}(e\dot{P}\dot{m})$ = residual F.D. of share-prices in the U.K. after elimination of $\dot{P}$ and $\dot{m}$; $\dot{m}$ = F.D. of long-term interest rates; $\dot{n}_o(e\dot{P})$ = residual F.D. of share-prices abroad after elimination of $\dot{P}$; R = sample values of coefficients of multiple correlation; $\bar{R}$ = Population values of R.

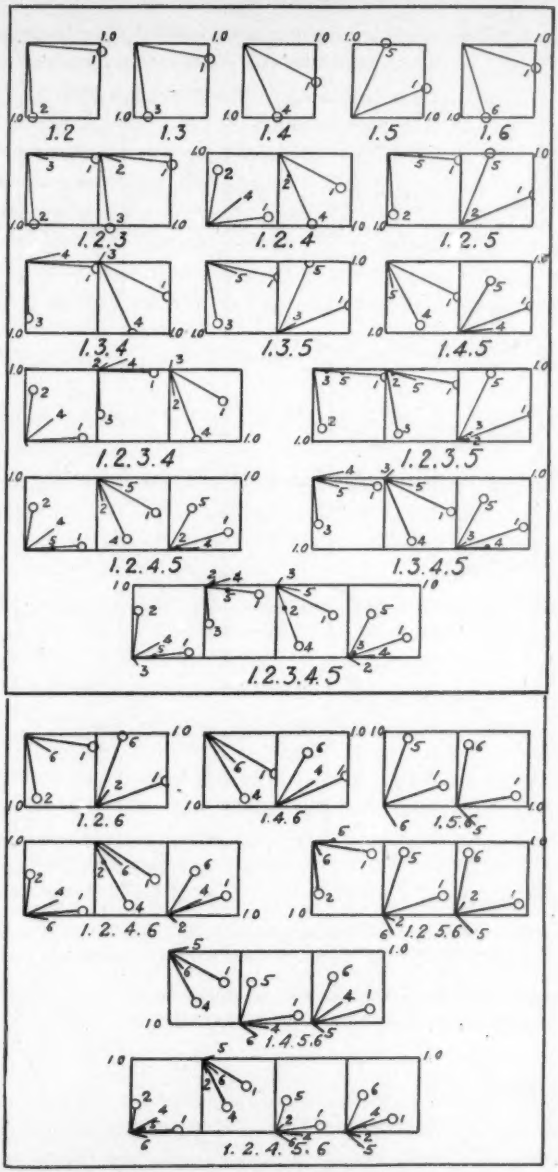
Notes. The suffix $_{-1}$ signifies one year's lag relative to the timing of the dependent variate. The figures in brackets are the standard errors of the respective estimates.

These results suggest that the best set is probably (1245), and this conclusion is reinforced by considering the movements in the population values of the coefficients of multiple correlation ($\bar{R}$) in equations 1, 2, and 3. These are as follows:

Set	*Equation*	$\bar{R}$
(1245)	1	0·56
(12345)	2	0·54
(12456)	3	0·56

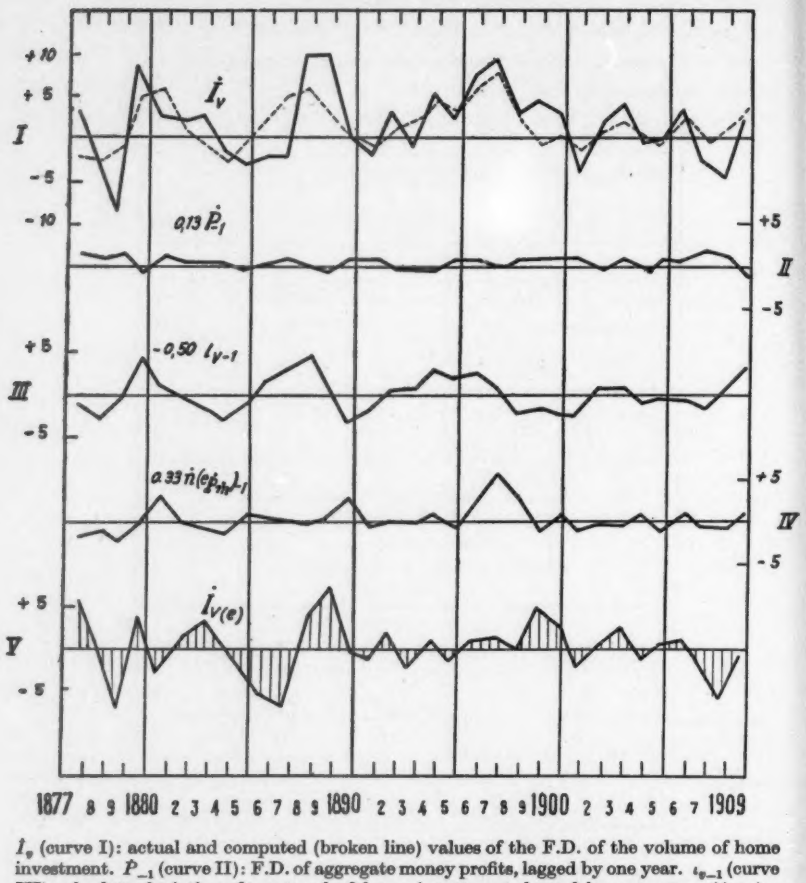
[1] See R. Frisch, op. cit., p. 103; J. Tinbergen, *A Method and its Application*, p. 103; R. Stone, op. cit., p. 309.

CHART 1. *Bunch Maps. Annual Changes of the Volume of British Home Investment, 1877–1909*



1. F.D. of the volume of British gross home investment.
2. F.D. of total net money profits, lagged by one year.
3. Residual F.D. of prices of investment goods after elimination of the influence of the F.D. of profits, lagged by one year.
4. Absolute deviations from trend of British gross home investment, lagged by one year.
5. Residual F.D. of share-prices after elimination of the influence of the F.D. of profits and the F.D. of interest rates, lagged by one year.
6. F.D. of long-term interest rates, lagged by one year.

CHART 1A. *Explanation of the Annual Changes of the Volume of British Home Investment, 1877–1909*



$\dot{I}_v$ (curve I): actual and computed (broken line) values of the F.D. of the volume of home investment. $\dot{P}_{-1}$ (curve II): F.D. of aggregate money profits, lagged by one year. i_{v-1} (curve III): absolute deviations from trend of home investment, lagged by one year. $\dot{n}(e\dot{p}_{\frac{1}{m}})_{-1}$ (curve IV): residual F.D. of share-prices after elimination of the F.D. of profits and interest rates, lagged by one year. $\dot{I}_v(e)$ (curve V): discrepancy between actual and computed values of $\dot{I}_v$.

It appears that the addition of variates 3 or 6 to the set (1245) does not improve the fit, which may be taken as an indication of their relative unimportance. The addition of variate 7 to the set (1245) causes a decline in the adjusted value of the multiple correlation coefficient from $\bar{R}_{1\cdot245} = 0{\cdot}56$ to $\bar{R}_{1\cdot2457} = 0{\cdot}54$. In view of the fact that the value of the regression coefficient of variate 7 is very low and not significantly different

from zero[1] ($0{\cdot}05 \pm 0{\cdot}09$), while the regression coefficients of the other variates remain relatively stable, one might consider that the influence of variate 7 is also most probably relatively unimportant.

The above findings so far indicate that out of the six explanatory variates, variates 3, 6, and 7 are relatively unimportant. The coefficient of multiple correlation in the set (1245) (equation 1) $R_{1{\cdot}245} = 0{\cdot}62$ is significant at the 0·5 per cent. point. Chart 1A shows a comparison of the actual and the computed values of variate 1 (F.D. of the volume of British gross home investment). The introduction of the quadratic terms of the explanatory variates in the set (1·245) and the fitting of a second-degree curvilinear expression hardly improved the fit obtained from the linear regression.

Since

(*a*) the bunch maps in Chart 1 show that the set (1245) is not affected by multicollinearity,

(*b*) the first lag autocorrelation coefficient[2] of the residual term in the regression (1·245) (equation 1, Table I) has the very low value of $r_1 = 0{\cdot}07$, the estimates of the coefficients in the set (1·245) may be considered as fairly reliable.

In order to consider the relative importance of each explanatory variate in determining the F.D. of the volume of home investment ($\dot{I}_v$, variate 1) one needs the values of the partial correlation coefficients. These are also presented in Table I together with their respective standard errors. Assuming that the sample values of these coefficients are normally distributed, it appears that the coefficient of partial correlation $r_{12{\cdot}45} = 0{\cdot}13 \pm 0{\cdot}18$ is relatively low and hardly significant, while $r_{15{\cdot}24} = 0{\cdot}42 \pm 0{\cdot}15$ is clearly significant at the 5 per cent. level. We may therefore conclude that the influence of variate 5 in determining the dependent variate is considerably greater than the influence of variate 2, as well as of variates 3, 6, and 7, which have already been found to be hardly significant. The relative importance of variates 2 and 5 can also be tested from the diagram of Chart 1A. However, before we proceed to draw further conclusions concerning the relative importance of variate 4 in determining the annual changes of British home investment, we have to consider an important problem of significance.

[1] This consideration is based on the assumption that the sample values of the coefficients are normally distributed about their population values.

[2] This was calculated using the ratio of the mean square successive differences to the variance of the error term (δ^2/S^2) from the formula

$$r_1 = 1 - \frac{1}{2}\frac{\delta^2}{S^2}.$$

The value of δ^2/S^2 for the residual term in the set (1·245) (equation 1, Table I) was equal to 1·86. It can be easily seen that as the ratio δ^2/S^2 approaches 2 the autocorrelation coefficient approaches zero.

The regression coefficient A of $(X_t - X_{t-1})$ on X_{t-1} of a series X_1, X_2, X_3,..., is given by

$$A = \frac{\sum (X_t - X_{t-1})X_{t-1}}{\sum X_{t-1}^2}$$

$$= \frac{\sum X_t X_{t-1} - \sum X_{t-1}^2}{\sum X_{t-1}^2}$$

$$= \frac{\sum X_t X_{t-1}}{\sum X_{t-1}^2} - 1.$$

Now, if the series X_1, X_2, X_3,..., is infinite and random,

$$\sum X_t X_{t-1} = 0 \quad \text{and} \quad A = -1.$$

Since the variance of the deviations of a series from a trend is smaller than the variance of the original series, the regression coefficient of the deviations of X_{t-1} from a 9-year moving average on $(X_t - X_{t-1})$ would be expected to be algebraically lower than -1. Consequently the coefficients of ι_{v-1} in Table I tend to be negative,[1] and their significance depends on the difference of their calculated values from the value which would be obtained if the series I_v were random. Further, the coefficient of partial correlation $-0{\cdot}49$ of ι_{v-1} is not comparable to the values of the other coefficients of partial correlation, since the latter are measured from zero while the former should be measured from the negative value which would be obtained if the series I_v were random.

Firstly, it may be considered whether the series I_v is of a random character. The ratio of the mean square successive differences to the variance of the F.D. of I_v was found to be 1·76. This ratio corresponds (in an infinite series) to an autocorrelation coefficient of the F.D. of I_v of 0·12. Since the autocorrelation coefficient of the F.D. of a random infinite series is $-0{\cdot}5$, the positive value of the preceding coefficient provides an indication of absence of an important random component in I_v.

Secondly, if the series I_v were random, the value of the coefficients of $(I_{v_t} - I_{v_{t-1}})$ on ι_{v-1} would most probably be algebraically lower than -1. If we now calculate our regression by introducing only ι_{v-1} and the residual changes in share-prices (Table I, equation 5), the regression coefficient $-0{\cdot}45$ of ι_{v-1} has a standard error $\pm 0{\cdot}15$. This means that the coefficient of ι_{v-1} is algebraically larger than -1 by more than three times its standard error, which is clearly significant (assuming always that the sample values are normally distributed about their population values).

But we cannot yet draw further conclusions as to the importance of variate 4 relative to the other explanatory variates, and particularly to the

[1] Cf. J. Tinbergen, 'An Acceleration Principle for Commodity Stockholding and a Short Cycle Resulting from It', in *Studies in Mathematical Economics and Econometrics* (in Memory of Henry Schultz), p. 265.

significant variate 5. In order to do this it is more convenient to calculate the regression in a slightly different form.

If we calculate the multiple regression of the F.D. of the volume of investment on the volume of investment and the residual F.D. of share-prices, both explanatory variates being taken with one year's lag, the following equation is obtained:

$$I_{v_t}-I_{v_{t-1}} = \underset{(\pm 0\cdot 04)}{-0\cdot 04 I_{v_{t-1}}}+\underset{(\pm 0\cdot 15)}{0\cdot 33\dot{n}(e_{\dot{P}\dot{m}})_{t-1}}+c_6+e_6, \qquad (6)$$

with $R = 0\cdot 45$, which for 2 and 30 degrees of freedom is significant at the 3·9 per cent. point.

Identifying

(1) with: F.D. of volume of British gross home investment (I_v) . . . . . $I_{v_t}-I_{v_{t-1}} = \dot{I}_v$

(2) with: I_v, lagged by one year . . . . . $I_{v_{t-1}}$

(3) with: Residual F.D. of share-prices in the United Kingdom after the influence of the F.D. of aggregate net profits and the F.D. of interest rates has been eliminated, lagged by one year. $\dot{n}(e_{\dot{P}\dot{m}})_{t-1}$

the zero-order correlation coefficients in the set (123) are as follows:

$$\begin{bmatrix} 1\cdot 0000 & 0\cdot 1046 & 0\cdot 4210 \\ & 1\cdot 0000 & 0\cdot 1193 \\ & & 1\cdot 0000 \end{bmatrix}$$

From the bunch maps presented in Chart 1 B we observe that the set (123) is not affected by multicollinearity.

The standard error of the coefficient $-0\cdot 04$ of $I_{v_{t-1}}$ is $\pm 0\cdot 04$, i.e. the regression coefficient obtained is by several times its own standard error algebraically greater than -1, which would be approximately the value of the coefficient if the series I_v were random. But equation 6 can be transformed to

$$I_{v_t} = 0\cdot 96 I_{v_{t-1}}+0\cdot 33\dot{n}(e_{\dot{P}\dot{m}})_{t-1}+c_6+e_6, \qquad (6a)$$

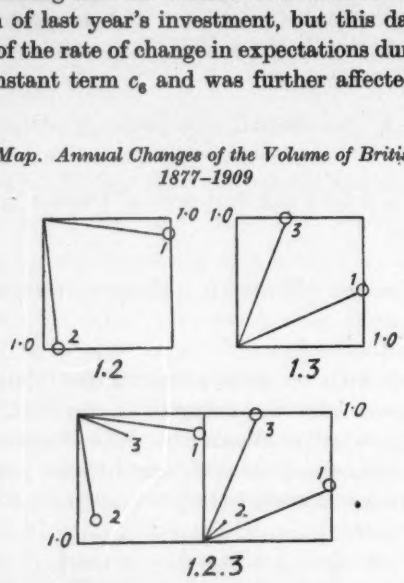
and if the coefficients are expressed in a normalized form equation 6*a* becomes

$$I_{v_t} = 0\cdot 96 I_{v_{t-1}}+0\cdot 10\dot{n}(e_{\dot{P}\dot{m}})_{t-1}+c_{6b}+e_{6b}. \qquad (6b)$$

The regression coefficients when expressed in normalized form ('beta' coefficients) are good approximations of the coefficients of partial correlation of the respective variates. Their values in equation 6*b* indicate clearly that the volume of British home investment in any year was influenced to a much greater extent by the volume of investment during the preceding year than by variate 5, representing the rate of change in expectations at home, which was found to be far more important compared to our variates

standing for the annual changes in profits, prices, the long-term rate of interest, and expectations abroad.[1] More specifically, equation 6*a* may be interpreted as meaning that the volume of investment in any year was a damped function of last year's investment, but this damping was offset by the influence of the rate of change in expectations during the preceding year and the constant term c_6 and was further affected by the residual factor e_6.

CHART 1B. *Bunch Map. Annual Changes of the Volume of British Home Investment, 1877–1909*



1. F.D. of the volume of British gross home investment.
2. Volume of British gross home investment, lagged by one year.
3. Residual F.D. of share-prices after elimination of the influence of the F.D. of profits and interest rates, lagged by one year.

Now the annual expectational changes in share-prices are associated with the current annual changes in the volume of investment in the following manner:

$$(\dot{n}_t - \dot{n}_{t-1})(e_{\dot{P}\dot{m}}) = 0{\cdot}54(I_{v_t} - I_{v_{t-1}}) - 0{\cdot}70, \qquad (7)$$

with $r = 0{\cdot}48$ which is significant at the 1 per cent. point.

By substituting in equation 6 for $\dot{n}(e_{\dot{P}\dot{m}})_{-1}$ the expression given by equation 7 we obtain.

$$I_{v_t} - I_{v_{t-1}} = -0{\cdot}04I_{v_{t-1}} + 0{\cdot}18(I_{v_{t-1}} - I_{v_{t-2}}) + c_8 + e_8. \qquad (8)$$

If we now calculate the regression of $(I_{v_t} - I_{v_{t-1}})$ on $I_{v_{t-1}}$ and $(I_{v_{t-1}} - I_{v_{t-2}})$ we have

$$I_{v_t} - I_{v_{t-1}} = -0{\cdot}03I_{v_{t-1}} + 0{\cdot}16(I_{v_{t-1}} - I_{v_{t-2}}) + c_9 + e_9 \qquad (9)$$

with $R = 0{\cdot}19$ which for 2 and 30 degrees of freedom is significant at the 11 per cent. point.[2]

[1] See above, pp. 46–49.

[2] If we introduce as an additional term $I_{v_{t-2}} - I_{v_{t-3}}$ in equation 9, the multiple correlation coefficient increases to $R = 0{\cdot}28$, but no further improvement in the fit is obtained if we add $I_{v_{t-3}} - I_{v_{t-4}}$.

Equation 9 is expressed in an autoregressive form. Consequently, the calculated coefficients, although obtained from the F.D. of the data, may be considered slightly biased downwards. But the difference between the multiple correlation coefficients 0·45 and 0·19 in equations 6 and 9 respectively is clearly significant. Since the residual (expectational) changes in share-prices—$\dot{n}(e_{\dot{P}/h})$—are correlated with current changes in gross home investment, we may conclude that the residuals of $\dot{n}(e_{\dot{P}/h})$ which cannot be attributed to current changes in investment were of considerable importance in determining the volume of investment during the following year. To the extent of the influences of the residual part of the expectational changes in share-prices, as well as of the residual term in equation 6, the cyclical movements of the volume of British home investment appear to have been determined by factors other than the levels of home investment during the preceding years.

3. A Comparison with Tinbergen's Findings

The results of the previous section establishing the relative unimportance of the movements of prices and the long-term rate of interest in determining the volume of investment agree with Tinbergen's conclusions. On the other hand, Tinbergen's findings indicate that the volume of investment is highly influenced by profits, as an approximation to which in the case of the United Kingdom between 1870 and 1913 he used a series of non-labour money income. According to our results annual changes in our index of net money profits appear almost unimportant, and the dominant factors seem to be the volume of investment lagged by one year and the residual (expectational) changes in share-prices.

Since the series of gross home investment, of prices of investment goods, of share-prices, and interest rates in Tinbergen's analysis are identical with the series which we have used, the difference between Tinbergen's non-labour income (indicated in his symbols by Z) and our own series of profits (P) might be considered as a possible partial explanation of the divergences in the results. The correlation $r = 0{\cdot}74$ between the annual changes in the two series,[1] although clearly significant, is not so high as not to account at least partially for the divergences between the two sets of findings. This can be ascertained by comparing the correlation coefficients between the F.D. of the volume of investment and the F.D. of Z and P, presented in Table II.

Although the introduction of different series as an approximation to profits might have been responsible for certain differences in the results, it can be shown that the main cause of the divergences is connected with the different methods applied in the calculations of the multiple regressions,

[1] See above, p. 43.

and that Tinbergen's estimates are very probably considerably affected by the continuity properties of the residual term of his regression equation.

TABLE II

Simple Correlation Coefficients between the Annual Changes in the Volume of British Home Investment and the Annual Changes in Tinbergen's 'British Money Non-Labour Income', and Prest's Series of Profits (Adjusted), 1870–1914

	Lag or lead of explanatory variate		
	One year's lag	*No lag or lead*	*One year's lead*
First differences of: Tinbergen's non-labour money income (Z)	0·10	0·50	−0·04
First differences of: Prest's series of profits, adjusted (P)	−0·18	0·52	0·18

The dependent variate in Tinbergen's demand equation for investment goods was derived from the series of values of gross home investment at 1907 prices, from which our own index (I_v) was calculated. The following are the series from which the explanatory variates in Tinbergen's equation were derived:

	Symbol
Non-labour money income in £m.	Z
Index of prices of investment goods with base year 1907 . . .	p_i
Short-term rate of interest in annual percentages	m_s
Long-term rate of interest in annual percentages	m

Table III presents the coefficients of the above multiple regression calculated in different forms, together with the ratios of the mean square successive differences to the variances of the respective residual terms δ^2/S^2.[1] Equation (iii) is Tinbergen's equation as presented in his unpublished work on 'Business Cycles in the U.K., 1870–1914'.[2] The coefficients in this equation were estimated from the deviations of the variates from their 9-year moving averages.

From Table III one observes that the residual term in equation (i) calculated from the original data of Tinbergen's variates is highly positively autocorrelated, and therefore the estimates of the coefficients are probably considerably biased. In fact, if we calculate the equation from the F.D. of the original data the regression coefficients obtained are considerably different and the multiple correlation coefficient falls from

[1] For the relation between the value of this ratio and the first lag autocorrelation coefficient of the residual term see above, p. 49, note 2.

[2] Ch. iii. 4.

$R = 0{\cdot}97$ to $R = 0{\cdot}44$, while the autocorrelation of the residual term approaches the value expected for a random series.

TABLE III

Tinbergen's Equation of Demand for Investment Goods in the U.K., 1870–1913

	Coefficients of multiple regression of British gross home investment at 1907 prices on the following explanatory variates					
	Z_{-1}	p_{i-1}	m_{s-1}	m_{-1}	R	δ^2/S^2
Multiple regression calculated from the:						
(i) original data (with a linear trend)	0·32	0·68	−1·97	−100·29	0·97	1·19
(ii) F.D. of the original data .	0·20	−0·26	−5·05	−62·40	0·44	2·12
(iii) deviations of the original data from their 9-year moving averages (Tinbergen's equation) . .	0·62	−0·20	−7·2	−46	0·76	2·46
(iv) F.D. of the deviations of the original data from their 9-year moving averages .	0·16	−0·58	−0·01	−57·64	0·42	2·33

Meaning of symbols

Z_{-1} = Tinbergen's non-labour money income, lagged by one year.
p_{i-1} = Index of prices of investment goods, lagged by one year.
m_{s-1} = Short-term rate of interest, lagged by one year.
m_{-1} = Long-term rate of interest, lagged by one year.

But the residual term in Tinbergen's equation (iii), which was calculated from the deviations of the data from their 9-year moving averages, appears not to be highly autocorrelated. We should expect, therefore, that the estimates in this equation are fairly reliable. But the apparent randomness of the error term in equation (iii) may be due to the intercorrelation between the explanatory variates and the true error term for the relation considered.[1] This can be tested by calculating the regression from the F.D. of the deviations of the data from their 9-year moving averages—equation (iv), Table III. If the residual term in equation (iii) was, in fact, not highly positively autocorrelated, the error term in equation (iv) would be substantially negatively autocorrelated. But contrary to this, the residual term in equation (iv) appears to have a very low autocorrelation. At the same time one observes a substantial fall in the multiple correlation coefficient from $R = 0{\cdot}75$ in Tinbergen's equation (iii) to $R = 0{\cdot}42$, which

[1] The bias towards randomness of the autocorrelated error terms has been shown to become greater as the number of explanatory variates is increased, see D. Cochrane and G. Orcutt, op. cit., pp. 43–5.

is fairly close to the value of $R = 0{\cdot}44$ obtained from equation (ii). The preceding considerations indicate that the coefficients in Tinbergen's equation (iii), as well as in equation (i) which was calculated from the original data, are of uncertain precision. The conclusions, therefore, which were drawn from the values of these regression coefficients, as well as the degree of multiple correlation which these estimates seemed to indicate, appear to be of very doubtful reliability.

We may therefore conclude that the major cause of the divergences between Tinbergen's results and our own findings was probably connected with the continuity properties of the error term of Tinbergen's equations, due to the procedure of correlating the data in their original form, or in the form of deviations from their 9-year moving averages.

An additional cause of the divergences is of course connected with the introduction in our analysis, as an additional explanatory variate, of the volume of investment lagged by one year, while this factor is not taken into account in certain parts of Tinbergen's work referring to the explanation of fluctuations in aggregate investment activity,[1] including the case of aggregate home investment in the United Kingdom between 1870 and 1913.

4. Negative and Positive Conclusions. International Influences on Cycles of British Home Investment

We may now proceed to the analysis of the economic content of our statistical findings. In order to do this it is probably helpful to restate certain of the assumptions upon which the preceding empirical investigation rests.

The following are the assumptions and some of the problems of interpretation related to them:

A. The selection of our variates was based on economic theory. Our statistical analysis aims at testing the degree of correspondence between the empirical data (related here specifically to British home investment in the period 1870–1913) and statements derived from analytical deductive reasoning.

B. The series which were introduced as variates are supposed to be adequate expressions of the economic factors which they represent. Apart from the problems and the technical difficulties of estimation and index-number construction, this assumption is connected with the question whether certain indices—assuming that there are no errors of measurement—are fairly representative of the economic factor for which they are

[1] See, however, Tinbergen's work and results on the cycles of shipbuilding (*Weltwirtschaftliches Archiv*, 1931, pp. 152 ff.) and residential building (*A Method and its Application*, op. cit., pp. 90 ff.).

introduced in our multiple regression analysis. Considerations of the latter type may raise the question, for instance, whether the (residual) movements of share-prices adequately reflect variations of expectations.

C. Events which may be considered as having a causal connexion with the movements of home investment must have occurred before the investment decisions were taken.[1] It is this assumption which makes necessary the introduction of the time-lag between our explanatory and our dependent variates.[2] Our results suggest that realized profits, as well as prices and interest rates, were relatively unimportant in determining changes in the volume of investment. But they do not indicate the relative importance of expected profits, expected prices, and expected interest rates. On the other hand, the general expectational factor, together with the accumulated stock of capital at any year, appear to be of considerable importance in determining the volume of investment during the following year. The extent to which the influence of expectations was exerted through anticipated profits, prices, or interest rates cannot be fully answered by our empirical investigation.

But the above shortcomings of our findings do not prevent us from drawing certain inferences. The state of expectations at any moment must be based on certain indications of some importance to the future course of business conditions. It appears that such indications were probably the changes in the volume of investment, which were found to be significantly correlated with changes in expectations during the same year. Hence, although realized movements in profits, prices, or interest rates appear not to have been responsible for inducing changes in expectations, prospective profits, prices, or interest rates were probably affected by the general state of expectations which appears to have been influenced by the current movements of the volume of investment.

Table II helps to illustrate the preceding argument with reference to profits. The annual changes of the volume of investment appear to be negatively correlated with the annual changes in profits lagged by one year, and significantly positively correlated with the annual changes in profits during the current year. Now it may be argued that the level of profits current to the flow of investment goods deliveries, the production of which was ordered or decided during the previous year, may have been

[1] This assumption constitutes the foundation of the so-called 'period' or 'dynamic' analysis of which there is a summary exposition in P. A. Samuelson, 'Dynamic Process Analysis' in *A Survey of Contemporary Economics* (edited by H. S. Ellis), 1948, pp. 353–5.

[2] Since, in the absence of monthly or quarterly figures, the series lagged by a fraction of a year are interpolated from the original annual data, the estimated lengths of the lags are probably only rough approximations to the true ones. They may be used for a 'testing' or 'explanatory' analysis, but the degree of approximation is not sufficient for predictive purposes. These considerations provide a reason for the not very high values of the coefficients of multiple correlation obtained in our regressions. Cf. also below, p. 58.

accurately anticipated by the entrepreneurs. But apart from the plausibility of such an hypothesis, our statistical analysis indicates that changes in the general level of expectations were not highly associated with current variations in realized net profits, while they were significantly correlated with the movements of the volume of investment. These considerations suggest that the positive correlation between annual changes in the volume of investment and current annual changes in profits tend to reflect an influence of the multiplier type exerted by the volume of investment on profits via aggregate effective demand. Our findings do not preclude that the effects of this causal connexion between investment and profits may have been more or less adequately anticipated by the business man. But if expected (as opposed to realized) aggregate money net profits were important in shaping British home investment decisions, their prospective values were probably much more influenced by the changes in the current volume of investment (through the anticipated multiplier effect) than by variations in their own realized values.

D. The application of the technique of multiple regression in testing business-cycle theories presupposes that the influence of the various factors can be regarded as constant within the period under examination. This assumption may or may not be justified. It may be argued that the degree of influence of each factor changes in the course of the trade-cycle.[1] In fact this is possibly an (additional)[2] explanation for the not very high values of the multiple correlation coefficients in our equations. But even if the influence of the particular factors on entrepreneurial decisions was changing during the trade-cycle, our regression analysis will indicate the relative importance of the various factors, provided that the movements in the degree of influence of these factors (on investment decisions) in the course of the cyclical fluctuations were approximately proportional. This latter assumption seems fairly reasonable.

We may now advance to a more detailed scrutiny of our statistical results with reference to the various types of business-cycle theories which have been put forward.

The influence reflected in the negative coefficient of ι_{v-1} in equation 5 (Table I) may be of a varying nature. The component b of the parameter $(b+c)$ in the equation expressing Kalecki's model reflects the influence of variations in the stock of capital on investment decisions directly through the marginal efficiency of capital, while the term c is a measure of the limitations set by increasing risk and imperfect competition to entrepreneurial activity when investment is expanding. But these limitations are of doubtful importance. According to Kalecki himself, the limitations due to

[1] Cf. M. Kalecki, *Studies in Economic Dynamics*, pp. 63–4.

[2] For another possible explanation see p. 57, note 2.

market imperfections could not be considered as really important, owing to the possibility always open to the business man of directing his activities in another line.[1] Also, doubts have been expressed about the validity of the principle of increasing risk with respect to its effect on entrepreneurial decisions.[2]

But even the elimination of the preceding alternatives does not lead us far enough. The marginal efficiency of capital is an expected ratio, probably influenced by the currently realized marginal rate of profit, hence its variations may be associated, either with a change in the level of the current rate of profits, or, while the current ratio remains unchanged, with the expected ratio which may vary in size or in the degree of certainty or the prospective risk involved in its realization. Finally, some combination of these alternatives may be the case.

Our results indicate that the changes in the marginal efficiency of capital are due neither to variations in aggregate realized profits (in the way suggested by Tinbergen), nor to variations in current costs as these are reflected in the prices of investment goods, nor to changes in the prevailing rate of interest.[3]

On the other hand, the negative association between the annual rates of change in the volume of investment and the deviations of the levels of investment from their 9-year moving average, one year earlier, may be due to a tendency in the current rate of profit per unit of capital to fluctuate during the trade-cycle, consequent upon the variations in the net additions to the stock of capital.[4] Such an explanation is not incompatible with some of the 'non-monetary' over-investment theories.[5]

Our findings do not preclude, further, the validity of a theory founded on a psychological or expectational basis, of the type, for example, advanced by Schumpeter[6] and in more recent years by Shackle.[7]

Finally, the preceding statistical investigation and argument were developed on the assumption that replacements and repairs do not

[1] M. Kalecki, *Essays in the Theory of Economic Fluctuations*, p. 98.

[2] See T. Wilson, *Fluctuations in Income and Employment*, 1941, p. 81.

[3] Although each of these factors had probably no dominant influence on the cycles of British home investment, their aggregate effect may have contributed to the influence of the 'expectational' factor in preventing the cycles from being damped. See above, p. 52.

[4] See references in p. 40, n. 2.

[5] See, for instance, D. H. Robertson, *A Study of Industrial Fluctuation*, 1915, especially pp. 180, 186–7.

[6] See J. Schumpeter, *Business Cycles*, 1939, vol. i, pp. 141–2. The statistical findings presented in the text are also compatible with a synthesis of the theories of Schumpeter and Kalecki on the lines suggested in the reviews of Schumpeter's *Business Cycles* by O. Lange, *Review of Econ. Statistics*, 1941, p. 193, and E. Rothbarth, *Econ. Journal*, 1942, p. 227.

[7] According to Shackle's theory, when 'the moving spirits' of the various business concerns have just made important additions to their plant or have organized and equipped new businesses 'they need a pause for observation, experiment, and adjustment, in short, a pause to consolidate their advances' (G. L. S. Shackle, op. cit., pp. 99–100).

fluctuate during the trade-cycle. If this assumption is abandoned the F.D. and the deviations from trend of the series of gross home investment cease to reflect annual changes and fluctuations in net investment only. But our calculations and results are not invalidated. They only have to be interpreted as referring to gross instead of net home investment. To what extent the assumption that expenditure for replacements and repairs shows only a trend movement is justifiable is still unknown. Recent work has shown in detail that in a number of major industries with large fixed capital installations, maintenance and replacements do tend to exhibit a cyclical pattern.[1] If this information is capable of supporting a generalization, our results do not contradict the theories of 'pure-reinvestment' cycles as originally presented by Marx, further developed by Robertson,[2] and recently tested by Einarsen[3] for the Norwegian shipbuilding industry.

Thus our statistical results provide no positive evidence in support of a particular trade-cycle theory, but the negative conclusions which may be drawn are not negligible. They indicate that all influences through variations in aggregate net profits, such as changes in the marginal propensity to consume or in the balance of payments or in the wages bill, were probably of small importance. It also appears that changes in the (long-term) rate of interest and in costs and prices had no significant influence on the fluctuations of British home investment between 1870 and 1913.

The whole set of considerations of this section would be compatible with the following more general conclusions:

A. The dominant causal connexion between the cyclical fluctuations in British home investment and the British national income during the period 1870–1913 consisted probably in a determining influence of home investment on the national income, of the multiplier type.

B. The channels through which international economic intercourse may have affected the cyclical fluctuations in home investment are:

(i) Changes in the balance of payments on current account reflected in changes in home effective demand.

(ii) Changes in the rate of interest induced by variations in the balance of payments and gold movements. But such changes are normally reflected in fluctuations of the short-term rate of interest. In view of the fact that for investment decisions the long-term rate is relevant, changes in the balance of payments and in gold movements could only have influenced home investment indirectly

[1] See R. F. Bretherton, F. A. Burchardt, R. S. G. Rutherford, *Public Investment and the Trade Cycle in Great Britain*, 1941, pp. 217–42; J. Einarsen, 'Reinvestment Cycles', *Rev. of Econ. Statistics*, 1938, pp. 4–7.

[2] *A Study of Industrial Fluctuation*, 1915, pp. 36 ff.

[3] See 'Reinvestment Cycles', loc. cit.

through the effect of the short-term capital market on the long-term rate of interest.[1]

(iii) Changes in business conditions abroad may affect business expectations at home.

But it seems that variations in aggregate effective demand and in the long-term rate of interest did not have an important influence on fluctuations of British home investment between 1870 and 1913. Nor did changes in business conditions in the major industrial countries appear to have had an important determining effect, although variations in income and activity in the primary producing areas which were borrowers from the United Kingdom probably considerably affected expectations at home. Hence our findings indicate that British home investment between 1870 and 1913 had a cyclical pattern, the dominant causes of which were to a considerable extent independent of international influences. Such influences probably affected to a certain extent cycles in British home investment by contributing to the factors which prevented the fluctuations from being damped. If this is true, international influences, mainly through business expectations at home, were responsible for preserving the temporal link between the variations in British home investment and the international trade-cycle.

[1] See J. Robinson, 'The Pure Theory of International Trade', *Review of Econ. Studies*, 1946–7, vol. xiv (2), p. 100.

ST. JOHN'S COLLEGE,
CAMBRIDGE.

THE RISE OF ADMINISTRATIVE OVERHEAD IN THE MANUFACTURING INDUSTRIES OF THE UNITED STATES 1899–1947*

By SEYMOUR MELMAN

PART I

INTRODUCTION

WITH the vast unfolding of American industrial production after the turn of the twentieth century, far-reaching changes occurred in the internal economies of manufacturing industries. The investment in large manufacturing units using costly machinery gave rise to the problem of fixed charges due to overhead costs. Interest in these 'costs which are not traced to units of output, or do not vary with output'[1]† was intensified by the occurrence of business depressions and resultant unused plant capacity. John Maurice Clark in his *Studies in the Economics of Overhead Costs* (1923) stressed the importance of costs due to idle capacity. The problem of the control of such costs has received regular attention from business men.

While attention has been focused upon those overhead costs which correspond to idle capacity, another type of overhead has been growing in importance: the costs of business administration, including managerial decision-making, coordinating, supervision, planning, record-keeping, and buying and selling. The outlays for management have risen continuously, as have the number of persons employed in these occupations. Their present-day importance is evidenced by the concern of business men for ways of minimizing overhead, even during periods of business prosperity.

During the four decades 1900–40 the population of the United States increased 73 per cent. and the labour force grew 81 per cent. Within the labour force in the manufacturing industries the directly productive workers, wage-earners, increased by about 87 per cent., but the administration personnel grew by 244 per cent. during this period.

The American pattern in this respect has been paralleled in other countries. We present in Table I the results of a survey by the International Labour Office covering the changing relationships of salaried to

* Professors Carter Goodrich and Walter Rautenstrauch of Columbia University, and Professor Solomon Fabricant of New York University were particularly generous in advising and aiding the writer during the course of this inquiry. Dr. Lawrence B. Cohen, Lecturer in Industrial Engineering at Columbia University, read the manuscript critically and contributed valuable comments. The author owes especial gratitude to Mr. Myron Melman, who is responsible for the charts and who did yeoman work in assisting with the massive statistical work that was required.

† Numbered references are placed at the end of the text.

manual workers in other industrial countries.* The pattern observed here is the widespread increase in the ratio of non-manual workers per 100 wage-earners in manufacturing and mining.

TABLE I

Numbers of Non-manual Workers per 100 Wage-earners

Country	*1905–11*	*1919–25*	*1929–34*
Germany . . .	..	11·9	14·0
Australia . . .	7·1	9·4	12·1
Belgium . . .	4·9	..	9·1
Canada . . .	8·6	15·8	16·9
United States . .	11·9	15·9	15·4
Finland . . .	5·7	8·2	8·7
Great Britain . .	7·6	9·5	11·3
Sweden . . .	9·0	10·2	13·1
Switzerland . .	6·8	..	9·6
Union of South Africa	..	5·6	7·6

Source: Censuses of establishments, &c. (mfg. and mining only), 'Statistical Survey of Non-Manual Workers', *International Labour Review*, vol. xxxiv, No. 2, August 1936, p. 249.

The steady increase in the productivity of directly productional man-hours has resulted in the 'release of about 25 per cent. of the working population from arduous manual toil'.[2] This decline in the man-power requirements per unit of output occurred together with a rise in the absolute and relative numbers of administrative personnel. These changes reflect a shift towards greater overhead cost in the economy as a whole.

Among business men there has been persistent uneasiness concerning increases in the fixed costs of administering business; among economists concern has been expressed about the growing rigidity of costs and prices. The rise of large administrative organizations has led critics to decry the 'bureaucratization of business'.

There exists a large literature purporting to account for these developments in the administrative overhead, and a variety of explanations have been offered, many of them contradictory.† We propose to establish the

* The United States figure for 1929–34 is an understatement of this relationship in manufacturing industries, resulting from certain arrangements of data in the Census of Manufactures (see Part II).

† We have reviewed this literature. The main hypotheses which have been suggested are: large firms and plants have relatively greater administrative costs (E. A. G. Robinson, 'The Problem of Management and the Size of Firms', *Economic Journal*, 1934, pp. 242 ff.; A. Marshall, *Principles of Economics*, Eighth Ed., p. 284; P. F. Lawler, *Records for the Control of Growing Manufacturing Enterprises*, Harvard University Press, 1947, p. 20; G. J. Stigler, *The Theory of Price*, Macmillan, 1946, p. 134); small units have greater administrative costs (J. Ise, *Economics*, Harper, 1946, p. 112); administrative costs are comparable for all firms (H. D. Anderson and R. E. Davidson, *Occupational Trends in the United States*, Stanford University Press, 1940, p. 589); corporate organization has caused a rise in these overhead expenses (Anderson and Davidson, op. cit., p. 588); multiple plant firms must increase such outlays

facts of the case by exploring the data for the American manufacturing industries over the half-century 1899 to 1947.

Part II of this paper presents a systematic survey of the growth of administrative personnel in relation to production personnel. The data for all manufacturing industries are available from 1899 to 1947. For a sampled group of industries the data 1899–1937 are portrayed graphically in order to set the stage for the review in Parts III and IV of the possible causes of the variation in administration outlays (comparable 1947 data for the sampled industries are not available).

In Part III we seek to account for differences occurring in a given census year. Here, for example, we ask: Does administration outlay correlate with firm or plant size? In Part IV the question becomes: Does the degree of increase in administration outlay correlate with the degree of increase over time in the size of firm? Comparable questions are posed in relation to the other hypotheses listed. Through graphic presentation we attempt to establish the presence or absence of presumed relationships. The inquiry takes a new direction in Part V, where similarities among industries and firms with respect to administration outlays are examined. We conclude the inquiry in Part VI with an analysis of major findings from our data.

The appropriate statistics may be derived from the data on personnel in manufacturing provided by the United States Census of Manufactures since 1899, and from the compilations of expenses of manufacturing firms by the Federal Government's Securities and Exchange Commission.

Since 1899 the employers answering the questionnaires of the Census of Manufactures have been directed to differentiate between persons 'in the management (salaried employees) and in production (wage-earners) . . .'. The salaried group included 'salaried officers of corporations, general superintendents, managers, clerks, and salesmen'.[3] For the purposes of this inquiry we add to the census group 'salaried employees', part of the separately designated class of proprietors and firm members, as well as the employees of central offices (offices of multi-plant firms).[4] Altogether, these comprise our class of *administration personnel*.

The *production personnel* in this inquiry include the 'wage earners' of

(Anderson and Davidson, op. cit., p. 588); modern selling methods involve greater overhead expenses (Anderson and Davidson, op. cit., p. 587); bureaucracy is a cause of larger administrations (M. E. Dimock and H. K. Hyde, *Bureaucracy and Trusteeship in Large Corporations*, Temporary National Economic Committee, Monograph No. 11, 1940, p. 35); productivity in manufacturing and the introduction of 'scientific management' leads to greater administrative expense (H. D. Anderson, *American Job Trends*, Chicago: Science Research Associates, 1941, pp. 44 ff.; H. Speier, 'The Salaried Employee in Modern Society', *Social Research*, i, 1934, p. 116); profitability results in management laxness and rise in management costs (M. E. Dimock, op. cit., p. 36); unprofitability is a pressure for enlarged administration budgets (Anderson and Davidson, op. cit., p. 589); government regulation requires increases in administration expenses (Anderson and Davidson, op. cit., p. 589).

the Census of Manufactures, plus the estimated productional portion of the proprietor group. The significance of these categories for our purpose is reinforced by the repeated instruction of the census editors that: 'The line of distinction between salaried employees and wage earners should be based primarily upon the character of the work done rather than upon the unit of time which is the basis for payment. Wage earners, in other words, are not confined to those who receive day wages, though most wage earners are paid by the day.'[5]

We have compiled the data on administration and production personnel for manufacturing as a whole as well as for sixty-nine selected industries for the years 1899, 1909, 1923, 1929, 1937. For 1947, only aggregate data could be prepared. The sixty-nine industries were selected as representative of many diverse attributes of manufacturing: product type; process; age of industry; extent to which production is automatic; average size of plant and firm; market conditions; concentration of control, &c. Moreover, the census definitions of these industries have been rather constant over the period reviewed.[6] We selected these six census years because they are all peak years of manufacturing and general business activity and were marked by successive increases in physical output and in manufacturing employment.[7] By comparing comparable periods of manufacturing activity we seek to minimize problems due to business fluctuation.

The absolute magnitudes of administration personnel do not, however, afford us a functional picture of the development of administrative outlays. In the case of the census data on manufacturing we shall therefore compare the administration personnel with the others, the production personnel, and we shall state the magnitude of the administrative overhead: as the ratio of administration personnel to production personnel (A/P).

Similarly, the monetary measures of administration outlays are most usefully stated in relation to production expense. We have computed such ratios for 123 firms in 9 industries and for 38 industries each taken as a unit.[8] These ratios are arithmetic means for every industry and in these senses relate to 'average' firms.

A final word on our measurement of administrative overhead. What is the relation of the A/P ratios computed from personnel data with those derived from financial data? What relevance can we attach to the personnel measures of administrative overhead? We may view the counts of A and P personnel as partial statements of resources devoted to these functions, the actual totals for which are obtained by expanding the personnel data into the total expense outlays. When such an expansion is done for the numerator (A) and denominator (P) of a capital good industry's A/P (personnel) ratio, the denominator, which includes the heavy

outlays for machinery and raw materials, will be enlarged relatively more than the administration numerator. Hence, by hypothesis, the A/P ratios in money units should be lower for such industries than the A/P ratio from the census personnel data. Conversely, the A/P ratio in money units should be greater for industries characterized by heavy administrative and selling expenses.

We have tested these hypotheses for a group of industries in 1937, for which usefully comparable data were available in both personnel and monetary units. The observed relations bore out the expectations of our hypothesis. As a result we should be able to control bias as to the magnitude of administrative overhead due to the use of personnel data for our historical series.

Part II

THE TREND, 1899–1947

We now present in Table II the measure of administrative overhead for all manufacturing industries from 1899 to 1947.

Table II

*All Manufacturing Industries: Composition of Administration and Production Categories, 1899–1947**

(In thousands)

Personnel	*1899*	*1909*	*1923*	*1929*	*1937*	*1947*
Salaried employees, including central office staffs	348	750	1,280	1,496	1,518	2,578
Proprietors (50%)	109	136	74	66	49	94
Administration	457	886	1,345	1,562	1,567	2,672
Wage-earners	4,496	6,256	8,187	8,361	8,553	11,916
Proprietors (50%)	109	136	74	66	49	94
Production	4,605	6,392	8,261	8,427	8,602	12,010
Administration / Production (%)	9·9	13·9	16·3	18·5	18·2	22·2

* The 1947 data were estimated as follows: The total number of salaried employees in manufacturing were reported by the Bureau of the Census as 2,378,000, with 11,916,000 wage-earners employed in the same year. To the reported salaried group we added 94,000 to account for half the estimated number of proprietors. The remaining 94,000 proprietors were added to the wage-earner group to give the total production personnel. The administration group required data for central office staffs. The author was advised by the Bureau of the Census that data for these personnel were collected in the 1947 census, but were not tabulated. We therefore estimated the number of central office personnel as 200,000, and added them to the salaried group to complete the estimate of administration personnel. The 200,000 figure is based upon the 1929 count and is necessarily an understatement of the 1947 figure, since there has been a growth in multi-plant firms since that time. As a result of our methods of estimating central office staffs for 1947 the A/P ratio given above for that year is probably an understatement of the actual relationship.

From 1899 to 1947 administration personnel increased 485 per cent. in the manufacturing industries, from 457,000 to 2,672,000 (Table II). Production personnel increased 160 per cent. from 4,605,000 to 12,010,000. The ratio of administration to production personnel was 9·9 per cent. in 1899 and reached 22·2 per cent. in 1947, an increase of 124 per cent.

Fig. 1 shows the number of administration and production personnel for all manufacturing for each of the five census years. The ratio of administration to production personnel is denoted by the dotted line labelled A/P. The values for this line are read from the scale of percentages at the right.

Another form of statement of the relationship of administration to production personnel is presented in Fig. 2. The scale of the *Y*-axis represents administration personnel and the scale of the *X*-axis measures production personnel. Each plotted point marked with a circle represents the aggregate relationship between administration and production personnel for each of our census years. The broken line passing through the 1899 point represents, in its slope drawn from the origin, the 1899 ratio of A/P, 9·9 per cent. Had this relationship of administration and production personnel been maintained as production personnel increased to 8,600,000 in 1937, the plotted points for subsequent years would also have rested upon the broken line of slope. Therefore the departure of each plotted point after 1899 from the slope representing the 1899 relationship denotes the increase in administration personnel relative to production personnel as compared with the 1899 relationship.

For 1937 we can also avail ourselves of the data for 1,741 manufacturing firms whose financial reports to the Securities and Exchange Commission were organized in categories convenient for our purposes. The administration expense* for these firms amounted to 3·5 billions and the production outlays† totalled 23 billions. The relationship of administrative to production outlays was 15·3 per cent. This ratio (AE/PO) compares closely with the A/P ratio of 18·2 per cent. from the personnel data of all manufacturing industries in 1937. Evidently the increments for purchased goods and services for administration and for production were relatively of equal proportion for the two types of function, with the result that the ratios in money and personnel terms did not show a wide discrepancy.

The lesser magnitude of the ratio (15·3 per cent.) from the S.E.C. data compared with census personnel A/P (18·2 per cent.) is consistent with the observation of Professor J. M. Clark to the effect that when measured in money units outlays for production include and conceal prior overhead

* Including selling and general expenses.
† Cost of sales only.

outlays.* The effect on the present data would be the relative enlargement of the denominator of the relationship AE/PO in money units, thereby reducing the size of the ratio.

The trend of administrative overhead for the sampled group of industries was computed from the data for their administration and production personnel in each of our census years. As noted above, the original census data were rearranged and additions were made to them, particularly for central office personnel. Appendix Table I shows for each sampled industry the computed magnitudes of administration and production personnel for the census years included in our study, as well as the A/P ratios, in per cent., for each industry.

The group of sixty-nine industries comprising the sample exhibits similar characteristics of rise in administration and production personnel, and of the A/P ratio, as was observed for all manufacturing. In the aggregate, the sampled industries showed a 90 per cent. increase in production personnel 1899–1937 as compared with an 87 per cent. increase for all manufacturing. Administration personnel in our sampled industries increased 270 per cent. as compared with the 244 per cent. increase in all manufacturing. The ratio A/P for sampled industries was lower than the ratio for all manufacturing, increasing from 8·7 per cent. in 1899 to 16·9 per cent. in 1937, an increase in the ratio of about 95 per cent.

In Fig. 3 we have arrayed the sampled industries according to their A/P ratio in 1899 compared with the same relationship in 1937. The rightward shift of the darkened columns representing the number of industries for A/P ratio groups in 1937 reflects the general increase in administrative overhead since 1899. The general shape of the distribution of industries is maintained.

Part III

VARIATIONS IN ADMINISTRATIVE OVERHEAD: DETERMINANTS AT ONE TIME

1. Size of Industry. Widely held opinions view the magnitude of the administration overhead as a function of size. The larger industries have well-organized trade associations, which supply valuable services to the management of member firms, and these industries, by virtue of their importance as employers, call into being corps of specialized personnel,

* 'The passing on of products and services to serve as means of further production results in converting the overhead costs of making these intermediary goods into direct or variable expenses to the industry which uses them, thus falsifying the picture the cost accounts give of the relative amounts of constant and variable costs. Hence financial accounting and cost accounting on business principles do not fairly represent the actual behaviour of the ultimate costs of industry. . . .' J. M. Clark, op. cit., p. 562.

trained to cope with their administrative and production problems. Training these employees in turn has required the operation of numerous universities with teaching staffs specializing in problems specific to these industries.

Size of industry is measured here by two criteria: total production personnel and total assets. Fig. 4 presents the relation between the average administrative overhead of each sampled industry and the production personnel of the industry in 1937. Each small circle represents one industry. For the industries grouped at the lower range of the X-axis there is clearly a wide variation in administrative overhead. The five industries with more than 150,000 production workers in each are found in the lower half of the A/P scale. The number of these industries of large size is few and they are scattered over a large range of the X-axis.

Another measure of industry size is the bulk of assets utilized. Fig. 5 relates the ratio of administration to production expense for selected manufacturing industries in 1937, with the total assets of these industries of that year. These data are drawn from the Securities and Exchange Commission's 'Survey of American Listed Corporations'. From the data of Figs. 5 and 6 there appears to be a lower average administrative overhead for the larger industries, so measured. The relationship is not linear, however. Many individual small industries also have lower overheads, though, as a group, the small industries have higher average A/P ratios than the larger ones.

2. Size of Establishment (Plant). The size of production units may be indexed in terms of average value added per establishment and average number of wage-earners per establishment. Fig. 6 presents the relation between average value added per establishment of the sampled industries and average administrative overhead for these industries, both data drawn from the Census of Manufactures of 1937. Fig. 6 shows the already familiar concentration of industries at the left side of the X-axis with great variation in the A/P values for these industries, the lesser variation in the A/P values for the scattered industries appearing in the larger size groups at the right of the X-axis.

The same type of distribution of industries appears in Fig. 7 which relates administrative overhead to size as measured by the average number of wage-earners per establishment.

3. Size of Firm. With the aid of the Securities Exchange Commission data we are able to test for possible relationship between money outlays for administration in relation to expenditures for production purposes, compared with the size of firms measured in terms of total assets. Fig. 8 presents group data by asset size for 892 manufacturing firms in 1937.

It should be noted that the asset groups are not of equal range, though they have been equally spaced along the X-axis for convenience in presentation. The plotted points connected by the upper line reflect dollars for administration as a percentage of dollars for production. The lower line of the graph represents dollars for administration for a percentage of net sales. It is apparent from this chart that there is an appreciable difference in relative administration outlays between smallest and largest asset-size firms. We have also examined data from the 'Survey of American Listed Corporations' of the Federal Securities and Exchange Commission showing administrative overhead dollar expenditures for firms in selected industries for 1937. The relation between asset size and administrative overhead for the firms within each industry were observed to follow the pattern of Figs. 4–7. As a group the larger asset-size firms generally fell in the lower values of the administrative scale on the Y-axis.

As a group, therefore, the larger firms showed a low ratio of administrative overhead. So, however, did many of the smaller firms in each given industry. The greater variation in the administrative overhead of the smaller firms, however, resulted in a higher group ratio as compared with the larger firms, measured by asset size.

The findings of an inquiry on the relative payments to executives by small and large firms are consistent with these observations. While 'dollar payments to all executives were substantially higher in large companies than in small companies, the large companies, however, distributed a lower percentage of earnings to executives than did smaller companies . . .'. The same study of the data for 1928 to 1936 concluded with the observation that 'large companies also paid to their executives a much smaller percentage of sales than did smaller companies . . .'. These salary payments were 'so inflexible that they might be fairly regarded as a fixed charge'.[9]

4. Corporate Organization. It has been suggested that the corporate form *per se* requires extraordinary administration outlays. Furthermore, large administration overheads are sometimes viewed as reflecting the requirements of corporation managements, the 'controllers' who are less concerned than are stockholders ('owners') in high rates of profit.

In order to test the relationship between corporation organization of business and differential administrative overhead, we have arranged in Fig. 9 the relationship between the industry A/P ratios and the percentage of total industry value product contributed by establishments in corporations. Both data are for 1929 and are drawn from the Census of Manufactures. The scatter recorded in Fig. 9 does not reflect any regular relationship between the magnitude of administrative overhead and the degree of corporate control in the industry.

5. Multi-plant Firms. It has been stated that multi-plant firms require relatively greater administration staffs than do single-plant firms; on the other hand, it is known that mergers are often concluded for the purpose of reducing administration outlays. Fig. 10 presents the relationship between the average A/P ratio of each sampled industry and the percentage of total industry value product produced by multi-plant firms. The percentage of value product by multi-plant firms was taken from (U.S. Temporary National Economic Committee Monograph 27) *The Structure of Industry* (pp. 211–25). It is apparent that the scatter of the plotted points in Fig. 10 reflects neither of the suggested relationships between multi-plant firms and the magnitude of administration outlays.

6. Concentration. Concentration of control is frequently said to result in high administration outlays. The Bureau of the Census made a special tabulation of Census of Manufactures data for 1935 for the U.S. National Resources Committee's *Structure of the American Economy* (p. 265). We have compared in Fig. 11 the proportion of each industry's value product contributed by the four largest producers in 1935 with the administrative overhead proportion computed for 1937. There is, of course, some degree of incomparability introduced by the 2-year difference between the data. But the short-run stability of these characteristics probably make this 2-year discrepancy of little significance in the present context. The random scatter of plotted points in Fig. 11 indicates no apparent relationship between concentration of control and administration outlays.

7. Operating Characteristics. Administrative overhead will now be considered in relation to profitability, pricing practice, amount of selling effort, and age of the firm (chronological). We also explore the relation of administrative outlays to degree of mechanization, employment of technicians, and product type.

Profitability. Relative outlays for administration purposes have also been associated with the profitability of firms. Under conditions of ample profits unchecked bureaucratic expansiveness is presumed to result in large administration expenditures. In a somewhat different vein the decline or threatened decline of profitability has been held to be an impetus to additional administration outlays in order to check failing profits. For selected manufacturing industries we present in Fig. 12 net profit as a percentage of sales, in relation to administrative overhead costs, both for 1937. These data of the Securities and Exchange Commission do not reveal any regular relationship between the variables. The same finding resulted from an examination of the relation between these variables plotted for individual firms within industries.

Pricing Practices. Associated in certain respects with intensity of selling effort are the market practices of industries with respect to the formation of prices. Where pricing occurs primarily as a function of the interplay of impersonal supply and demand factors we might expect relatively less selling effort than under conditions of administered pricing. In the latter case the firms involved must have recourse to the varied devices of non-price competition to attain the greatest possible net advantage for the firm.

As an indication of administered pricing we may utilize the ratio of 1932 depression with respect to 1929 prosperity prices compiled for manufacturing industries by Gardiner Means as an index of price flexibility and presented in the *Structure of American Economy*. In Fig. 13 we have compared administrative overhead for 1937 with the price ratio of 1932 to 1929 prices, in per cent., for the twenty-seven industries for which such data are available. The array of related points does not suggest an orderly relation of administrative overhead to degree of price administration.

Selling Effort. Relatively large administration outlays have been held to result from the heightened intensity of selling effort that occurs under conditions of unused capacity. At such times, it is alleged, managements hasten to spruce up selling organizations and procedures in an effort to cut short the frightening prospect of large fixed charges due to idle plant machinery.

In 1923 the Bureau of Census included an unusual question in the census schedule regarding the 'actual value of output as a percent of maximum possible output'.[10] The schedule of the census did not detail precisely what was to be understood as 'capacity'. The phrasing was such, however, as to suggest that 'maximum possible output' meant capacity under prevailing usages as to hours of work, intensity of work, use of machinery, and the like. The relation of administrative overhead of each industry to the ratio of actual to possible output in 1923 is presented in Fig. 14. Clearly there is no definable direction of relationship, increasing or decreasing, between administration outlays and unused capacity.

A more direct approach to intensity of selling effort in relation to administrative overhead can be made through the data of the Census of 1929 on *Distribution of Sales of Manufacturing Plants*. In this census report there appears an analysis of the distribution of sales of manufacturing industries by major classes of manufacturers' customers. For each class of customers the percentage of total sales for the industry is indicated. Our interest is in the classes of customers which by their very nature require selling effort from the manufacturer's own sales force that is accounted for in the 'Salaried Personnel' reports of the Census of Manufactures.

These outlets include: manufacturers' own wholesale branches, direct sales to retailers, and sales to household consumers. In the furniture industry, for example, 3·2 per cent. of sales in 1929 were made through manufacturers' own wholesale branches, 52·3 per cent. directly to retailers, and 2·6 per cent. to household consumers. These outlets account for 58 per cent. of the industry's total sales.

In Fig. 15 we have plotted the aggregate percentage of manufacturers' sales through the designated outlets against the A/P ratios for the sampled industries accounted for. The sales data are available for 58 of our 69 sampled industries. The distribution of A/P ratios with respect to percentage of sales through outlets requiring the manufacturers' own selling personnel, accounted for as 'salaried personnel', shows no regular relationship. There is thus no apparent correlation between administrative overhead and the proportion of direct selling done by the manufacturers' own staff.

Net Sales. Another index of activity by the firm is afforded by the data on net sales. These data for manufacturing industries were from the compilations of the Securities and Exchange Commission.

The distributions of firms within industries were comparable to the type of distribution found in the chart relating administrative overhead and total assets. The larger firms, as a group, appeared in the lower range of values on the *Y*-axis which represented, in per cent., the A/P expense ratio. The smaller firms occupied a wider range of values along the *Y*-axis, so that, as a group, their average administrative overhead value was greater than that of the largest group of firms. At the same time many of the smaller firms had low administrative expenditures and occupied a position on the *Y*-axis comparable to many of the larger firms.

Age of the Firm. It has been suggested that the magnitude of administrative outlays may be related to the age of firms and industries. Firms that are old in years are presumed to be inflexible, relatively, with respect to administration practices, are rooted in set ways, and do not show the readiness for adjustment that is more typical of progressive managements unburdened by a weight of tradition. Data on age were taken from the records of the Securities and Exchange Commission's *Survey of American Listed Corporations.* It was apparent from these data that there was no clear relationship between administrative overhead and the age of firms.

Mechanization. High administration outlays have been said to be associated with intensity of mechanization. In Fig. 16 we show the relationship between average horse-power per wage-earner and the magnitude of administrative overhead for each of our sampled data. The comparison of administrative overhead and horse-power per wage-earner portrays the

possible relationship between the relative degree of mechanization of an industry and its average A/P ratio. The distribution of industries appears to be similar to the several charts showing the relation of A/P and difference in size.

Technicians. The employment of technicians has been suggested as an important cause of differential size of salaried personnel staffs. They are engaged to carry out the details of production planning and organizing, industrial research, and the design of productional technologies. The Census of Manufactures personnel categories are so defined as to result in the reporting of this class of personnel under the salaried group. They are therefore included in our count of administration personnel.

From the 1930 Census of Population reports[11] we abstracted the total technician personnel for eighteen listed industries.* The average ratio of technicians to total production personnel for these industries was 1·9 per cent. When this ratio was contrasted with the total administration to production ratio of the comparable industries of that year it was evident that, in the main, the technician personnel were a small part of the total administration staffs. For our sampled industries the technician staffs loomed large only in 'Electrical machinery', 'Glass', 'Paper and pulp', 'Ship and boat building', 'Soap', and 'Steel works and rolling mills, including blast furnaces'. The highest ratio of technicians to total production staff was 8 per cent. in petroleum refining followed by 6 per cent. in electrical machinery. For the others the relationship was appreciably less.

Product Type. It may be suggested that characteristics of the product may have a bearing upon the relative magnitude of administrative overhead. In Bliss's inquiry on *The Structure of Manufacturing Production*,[12] analysing the data for 1929 in particular, a measure was made comparing capital goods and consumption goods industry which is relevant to this study. Bliss took the ratio of salaried personnel to wage-earners of 326 manufacturing industries, classifying them as consumption goods industries (254) and capital goods industries (72). For these two arrays of industries Bliss computed the median values of the ratio of salaried personnel to wage earners. For consumption goods the median was 17·2 per cent., practically identical with that of the capital goods industry of 17·3 per cent. Apparently type of product is not a differentiating factor in relation to administrative overhead.

* The industry classifications of the Census of Manufactures and Census of Population are not strictly comparable. See Fabricant, S., 'The Changing Industrial Distribution of Gainful Workers: Some Comments on the Decennial Statistics, 1820–1940', appearing in *Studies in National Income and Wealth*, vol. xi, National Bureau of Economic Research, New York, 1949.

8. Summary of Findings. Differences in magnitude of administrative overhead at one time appear to be independent of all the variables tested, except size. For all the indices of size the distribution of the plotted points took the general form of decreasing average A/P with increasing size. The variation around the mean values, however, is greatest for the small size units, then diminishes with increasing size. This pattern is all the more impressive since comparable results are obtained regardless of the index of size used. (For firms grouped by industry: number of P personnel; total assets; average number of wage-earners per establishment; average value added by manufacture per establishment. For individual firms: net sales; total assets.) The apparent similarity of the distribution relating A/P with degree of mechanization (average horsepower per wage-earner) is consistent with these findings, for mechanization has generally correlated with size difference, larger plants using, on the average, more machinery per wage-earner.

It therefore seems reasonable to infer that size *per se* is, on the average, a differentiating factor in administrative overhead.

The magnitude of administrative overhead does not appear to be systematically related to the following factors: corporate organization; multi-plant firms; concentration; profitability; pricing practices; selling effort; age of firm; employment of technicians; product type.

In our introduction to Part II we compared the measures of administrative overhead based upon the data of the Census of Manufactures and of the Securities and Exchange Commission. In many of the charts of this chapter we have utilized census data in the attempt to discover possible correlations between administrative overhead as measured in personnel terms and various characteristics of industries and firms.

What is the relation between these distributions based upon the data of the census and the distribution that would occur if the scale of the *Y*-axis represented a ratio of dollar expenditures for administration divided by dollar expenditures for production purposes? Would we obtain rather different distributions in our charts if the data were cast in such terms?

A review of Fig. 7 of this part will show that special markings have been inserted in the plotted circles of the sampled industries. A horizontal line is drawn through those industry points whose ratio of administrative overhead would be lower in dollar terms than the present A/P ratio in terms of personnel. A vertical line appears in the plots of those industries whose ratio in dollar units would be greater than in personnel terms. From Fig. 7 it is apparent that no major relationships have been obscured by the use of census data that would have appeared had it been possible to use financial data throughout for the measurement of administrative overhead. Indeed, correctness of our measure of administrative overhead,

based upon census personnel data, is confirmed by the similarity of results obtained by the use of both methods. (Similar tests were made on the other charts showing variation in size.) Our previous statement of conclusions is thereby given added force.

Having established the trend in administrative overhead from 1899 to 1947, we explored the variations in A/P at single times and found that size *per se* was a differentiating factor. We will next turn to the problems of discovering the determinants of change in administrative overhead over time.

Part IV

VARIATION IN ADMINISTRATIVE OVERHEAD: DETERMINANTS OF CHANGE-OVER TIME

The changes in the administrative overhead must now receive further attention. How can we account for the changes in administrative overhead that occurred from 1899 to 1937? What are the factors operating over time which give rise to manifestly increasing administrative expenditures?

We know that the period being examined, 1899–1937, was characterized by many changes in the economic environment. Which of these changes are related to changes in administrative overhead? The changes that occurred in administrative overhead were not uniform over the period 1899–1937. They differed among industries. Therefore the problem becomes one of comparing the degree of change in administrative overhead with the degree of change in possible associated factors. For example: Does the degree of change in administrative overhead correlate with degree of change in size of plant?

The degree of change in administrative overhead is the percentage of change in the A/P ratio from 1899 to 1937. If the ratio was 10·0 per cent. in 1899 and 15·0 per cent. in 1937, the degree of change was plus 50·0 per cent. In a comparable manner the degree of change in suggested independent variables is computed as the percentage of change from the 1899 to the 1937 magnitude of the variable. The charts following show degree of change in administrative overhead on the Y-axis and degree of change in independent variables on the X-axis.

One of the significant developments in modern business history is the tremendous growth in size of industries and of industrial plants. As distinguished from the previous section in which we inquired as to whether large-sized industry *per se* requires a systematically larger or smaller administrative outlay than small-sized industry, here we inquire into the underlying dynamics of the business process and ask whether the factors

giving rise to the increase in size were associated with the growth of administrative overhead. This may be explored by examining the degree of change-over time in administrative overhead of each industry in relation to the degree of change in the size of the industry.

1. Change in Volume of Physical Output. We approach the possible relationship between change in administrative overhead and change in size of firm and industry by first comparing change in industry A/P ratios with change in the volume of physical output 1899–1937. These data on change in physical output available, for twenty-five of our sampled industries, are drawn from Fabricant's computation.[13] The distribution in Fig. 17 does not reveal a clear relationship in the degrees of change between physical output of industries and administrative overhead.

2. Change in Size of Industry (Production Personnel). The absolute number of direct labour employees is often taken as a measure of the relative size of an industry. We therefore compare in Fig. 18 the relationship between percentage change in administrative overhead with percentage change in the number of production personnel. These data include all our sampled industries from 1899 to 1937. The great concentration of plotted points on the left end of the X-axis characterizes this distribution, though it may be noted that the industries showing very large percentage increases in production personnel (over 600 per cent.) appear in the lower range of percentage changes in administrative overhead personnel. The industry plotted at the extreme right of the graph of production personnel increase, falling far beyond the scale on the X-axis, is the motor vehicles industry.

3. Change in Size of Plant. For each of the sampled group of industries we can compute a measure of the average size of plant in terms of persons employed or value added by manufacture, by dividing the number of employees or total value added by the number of establishments (manufacturing plants). The average figures so obtained are representative of the size of the plant of the individual industries and vary appreciably among industries. The degree of change in these measures of average size of plant is obtained by computing the percentage change in, for example, average value added per establishment in 1899, with the comparable datum in 1937.

Fig. 19 shows the relation between degree of change in average value added per establishment compared with degree of change in average administration overhead for each of the sampled industries. The general shape of the distribution is similar to that of Fig. 18. The industries grouped along the lower range of percentage changes on the X-axis show a wide variation in the accompanying degree of change in administration

overhead. On the other hand, the few industries with extraordinary increases in average value added per establishment appear to have experienced, as a group, a low average degree of increase in administrative overhead.

A similar relationship among the sampled industries appears in Fig. 20, which compares change in average number of wage-earners per establishment, 1899–1937, with change in administrative personnel for each of the sampled industries. Here again the few industries showing the very largest increases in average number of wage-earners per establishment are, as a group, low on the scale of increase in administrative overhead. Of the three industries appearing at the extreme right of the *X*-axis two underwent a change in size twice as large as the next largest group, while the industry with the very largest percentage increase in average wage-earners per establishment (motor vehicles) is more than twice again as far along the *X*-axis as the nearest two.

4. Change in Output by Corporations. Increase in the use of a corporate form of business organization is held to be a cause of large administration outlays. In accordance with this hypothesis we would be led to expect a differential increase in administrative overhead as a function of increased degree of corporate organization. The decennial censuses of manufactures report on the type of prevailing business organization and the value product produced by the establishments so organized. We therefore compare in Fig. 21 percentage change in the proportion of total industry value product by corporations from 1899 to 1929 against percentage changes in administrative overhead of the sampled industries over the same period.

The industries which show very large degrees of change in the use of the corporate form appear low on the *Y*-axis scale of percentage change in administrative personnel. Still the relatively low *Y*-axis values for these industries are matched by a larger number of industries which showed but little change in the degree of utilization of corporate organization. The distribution appears to be comparable with those portraying changes in size.

5. Changes in Concentration. Increased concentration of control has also been held to be a major factor in the growth of administration staffs. Let it be assumed that this is a cause of differential increase in the A/P ratio. In Fig. 22 percentage changes in administrative personnel from 1909 to 1937 are plotted in relation to changes in an index of concentration from 1914 to 1937. The index of concentration reflects the change in the number of establishments of each industry, accounting for 50 per cent. of the value product. These indices were computed for T.N.E.C. Monograph No. 27, *Structure of Industry*, pp. 54 f.

A degree of distortion in the configuration of plotted points may arise from the difference in periods of the two sets of data; percentage change in administrative overhead based upon change from 1909, and index of concentration changes based upon the condition as of 1914. We take comfort, however, in the likelihood that the distortion is not of large magnitude since the period 1909 to 1914 was not one of spectacular change in the matter of industrial concentration. Fig. 22 does not evidence a regular relationship between changes in concentration, so measured, and changes in average administration overhead personnel of the sampled industries.

6. Change in Operating Characteristics. The operating characteristics, changes in which are compared with changes in administrative overhead, include: change in productivity per wage-earner, change in mechanization, increased employment of technicians, economic age of the industry.

(*a*) A crucial consideration in possibly accounting for change in the ratio of administration to production personnel is the increase in productivity of the production employees. Such an increase in productivity would be reflected in a rise in the A/P ratio (due to relative diminution of the denominator). In Fig. 23 we have plotted the relation between change in number of wage-earners per unit of physical output (1899–1937) on the *X*-axis, and percentage change in the A/P ratio (1899–1937) on the *Y*-axis. The data on change in 24 of our 69 sampled industries are drawn from Fabricant's *Employment in Manufacturing Industries, 1899–1939.*

If increases in productivity were associated with relative increase in A/P, then those industries with the greatest diminution in wage-earners per unit of physical output would show the largest increases in A/P ratios. However, the plotted points suggest no such relationship.

(*b*) Closely related to employee productivity is the measure of mechanization in terms of installed horse-power per wage-earner data reported in the Census of Manufactures' decennial censuses. We may therefore compare the data of 1899 and 1929. In Fig. 24 we present the relationship between percentage change in average installed horse-power per wage-earner, in the plants of the sampled industries, and the changes that occurred in administrative overhead. The array of plotted points in Fig. 24 does not suggest a regular relationship between the changes in the variables.*

* In Part III we noted that the degree of mechanization (horse-power per wage-earner) and A/P ratios seemed to be associated in much the same pattern as A/P and size. Why, then, does not a chart portraying change in mechanization show a similar relation with those presenting change in size? This may be due to the trend towards heavily mechanized small plants in many industries, made possible by the development of technologies that facilitate decentralization of physical plants: electric motor-powered machines; motor truck transport, &c. Cf. the discussion of decentralizing technics in L. Mumford's *Technics and Civilization*, ch. 5, and J. Blair, 'Technology and Size', *Proceedings of the American Economic Association*, 1948.

(*c*) Increased employment of technician personnel has also been declared an important factor in the increased number of administration employees (cf. the data of Part III on technicians). Comparison of the ratio Technicians:Production personnel, with the ratio Administration:Production personnel of each industry, indicates that the technicians form but a fractional part of the administration group.

Let us remove the technicians' percentage of the total A/P for 1937 assuming that they were classified in our administration personnel components. We will further assume that there were no technicians employed in 1899. Then, on the average, the reduction of the 1937 aggregate A/P ratio for the sampled industries would be of the magnitude of 2 per cent. If we assume that technicians were also employed in 1899 (draughtsmen, chemists, and mechanical engineers, &c.) the effect would be even to lessen the increment of the administrative overhead increase imputed to the addition of the technician occupations to the administration personnel in manufacturing.

These data lead us to deny the hypothesis that the addition of technician personnel to administration staffs is responsible for the measured rise in administrative overhead in manufacturing. The technician occupations form but a minor part of the observed administration increase.

(*d*) The relation of magnitude of the administration overhead to chronological age of firm, which we analysed in Part III, may not be as significant a measure as economic age of the industry. The problem we pose here is the existence of a possible relationship between change in administrative overhead of an industry and its position in the course of industrial growth and decline.

It has been demonstrated by Fabricant that in the long run the outputs of manufacturing industries first increase, gradually level off, then decline. From Fabricant's *Employment in Manufacturing, 1899–1937*, we obtained for sixteen of our sampled industries the peak year of physical output and the peak year of wage-earner employment. With these data we could test for the existence of relationship between observed changes in administrative overhead and the economic age of manufacturing industries. These peak-year data provide a means for comparing changes in administrative overhead (A/P) over comparable economic periods in the history of different industries.

We set up two relevant hypotheses. If there is a relationship between economic age of the industry as indexed by its output peak, and the change in administrative overhead, we should find that the A/P ratio for the industry should increase for those industries in which the peak year of wage-earner employment precedes the peak year of physical output. By hypothesis, there should occur a decrease in the A/P ratio in the

intervening period between the peak of employment and the following peak in physical output. Under such conditions the number of production employees declines while business activity increases. The denominator of the A/P ratio is decreased while expanding production requires equal or even expanded administration personnel.

For fourteen industries the peak year of employment preceded the peak year of output. We found that the behaviour of six industries conformed to this hypothesis, the A/P ratios decreased; while eight behaved contrariwise, the A/P ratios increased. From these data there appeared to be no regular effect on change in administrative overhead resulting from a peak of industry wage-earner employment, preceding a peak in physical output. The inverse of this hypothesis is that a decrease in administrative overhead should occur for those industries, and during the period, in which the peak of output leads the peak in employment. None of the sampled industries conformed to this hypothesis, while two showed an increase in administrative overhead, contrary to hypothesis.

Economic age, as indexed by peak physical output of an industry, does not appear to be related to the changes that subsequently occur in administrative overhead.

7. Miscellaneous Qualitative Factors. Several possible causal factors underlying the increase in administrative overhead remain to be considered. Tax laws, conspicuous consumption by business administrators, and bureaucratic behaviour have been suggested as important elements in accounting for the striking rise of administration staffs in the manufacturing industries.

It has been suggested that business men, particularly during prosperous years, are prone to add new administration outlays since these outlays are not subject to taxation and may well result in added business for the firm. There is nothing in the nature of administration outlays, however, which should make these functions a preferred area of expenditure over outlays for directly productional purposes. On the contrary, there is an *a priori* basis for suspecting that production purposes would be preferred as points of non-capitalized expenditures under such circumstances, due to the greater predictability of material outcomes from productional outlays.

The personnel chief of a large firm advised the writer at one time that departmental chiefs attempt to secure increases in the numbers of their subordinate personnel. Such increases comprise a conspicuous measure of relative importance of a department and hence of its chief. Reporting on the German experience in these matters, Dreyfuss[14] observes that 'a multitude of departments and gradations strengthens the self respect of

the employer and his ambition to be the head of an organization'. Assuming this to be valid, the problem remains: Why have the personnel of administration increased more than the production personnel?

Administration staffs include that class of personnel particularly devoted to building goodwill among customers. The employment of expensive salesmen for this purpose and the expenditures of substantial sums for entertainment and the like are forms of advertising, and are probably subject to the same cumulatively increasing norm of what constitutes necessary expenditures. Expenditures for office equipment and furnishings frequently emphasize the worth attached to this type of appearance.

Even granting the prevalence of these types of behaviour, it does not serve as an explanation of why conspicuous display takes this particular direction. Model factories can also serve as devices for competitive display. Neither do such considerations explain the apparent differentiation between large and small firms with respect to administration outlays. Elaborate offices may be classified under the heading of conspicuous consumption, but pleasant workplaces and well-arranged floor space contribute to the efficiency of the work performed. If it were possible to measure productivity of administration personnel we might have more data on this subject. In the absence of such data we can only say that conspicuous display forms an inconclusive reason for the enlargement of administration personnel and expenditures.

Bureaucracy as such is frequently regarded not only as a result of large-scale business operation but as a further cause in itself of expansion in administration. In the tradition of Max Weber,[15] bureaucracy is a disciplined organization devoted to an impersonal end, and involves 'specialization in terms of clearly differentiated functions, divided according to technical criteria, with a corresponding division of authority hierarchically organized leading up to a central organ.... The role of each participant is conceived as an "office" where he acts by virtue of the authority vested in the office and not of his personal influence....'

Some business executives bemoan the difficulty of making changes in their management routines due to what they regard as unwieldy size of their organization.[16] They seemingly confirm the prognosis that large size of business organizations gives rise to a bureaucratic drift. Some of the writers in public administration take a serious view of what they regard as a limit 'beyond which human ability and intelligence is no longer able to direct the complex operations of a huge administrative machine'. Beyond this point a 'law of diminishing managerial returns' manifests itself in bureaucratic inefficiencies.[17]

Other writers emphasize: the unwieldy bodies of regulations to which blind obedience must be given, to the detriment of ultimate objectives;[18]

'the artificial differentiation of the rank order, which far exceeds the gradation warranted by the technical requirements of an establishment';[19] the promotion of 'individuals who do not cause friction in the establishment. The upholding of discipline becomes an end in itself . . .';[20] 'the difficulty, inherent in the bureaucratic machine, of reconciling individual initiative with the mechanics of its working . . . this need not be so . . . but it is difficult to avoid and there is no simple recipe for doing so';[21] the lack of coordination and working at cross purposes; also the lack of good morale in bureaucratic organizations.[22]

An altogether different view of administrative behaviour is taken by other students of modern business organization. Rules and regulations have the usefulness of ensuring predictability of performance of administration personnel under recurring conditions of business operation. What is caustically derided as 'buck passing' merely means referring a problem to the proper person.[23] Impersonality has been ascribed as a characteristic peculiar to administrations of large size. It is nevertheless true that this characteristic is not exclusive to such administrations. Impersonality may also mean dispassionate analysis, appraisal apart from the weight of personal preferences. Impersonality, in this sense, is frequently a desirable trait, as in the work of teachers grading examination papers of their students.

More important than this type of argumentation pro and con is probably the type of evidence which we have presented as to the relationship between relative administration outlays and the size of firms and production units. The evidence there does not suggest that larger firms and units are at a disadvantage.

8. Summary of Findings

Large increases in average size correspond with relatively small increases in administrative overhead. This result appears in all our charts relating change in administrative overhead with change in size, regardless of the criterion used as a measure of size (average number of wage-earners per establishment, average value added per establishment, physical output of the industry, number of wage-earners in the industry). Just how this relates to the findings of Part III on lower average A/P for large units remains to be established. We also found that change in incorporation showed a distribution similar to change in size. The change in size factor is probably the crucial element here, to which incorporation change is an accompanying characteristic. In effect, then, Fig. 21 on change in degree of incorporation relates change in A/P with factors similar to those operative in the data of Figs. 17–20 on change in size.

None of the other aspects of business operation, whose change we

compared with change in administrative overhead, appears to be selectively related to the growth of this overhead. The underlying dynamics of change in administrative overhead are apparently not related systematically with change in concentration of output; wage-earner productivity; mechanization; employment of technicians. Neither does there seem to be a relation with economic age of an industry.

This is all the more interesting since there is clearly an overall, persistent growth in administrative overhead over time.

Part V

SIMILARITIES IN THE CHANGE OF ADMINISTRATIVE OVERHEAD

In Part III we examined the data on variation among industries and firms at a given time with respect to the magnitude of administrative overhead. Part IV compared variation in degree of change in administrative overhead with degree of change in a series of presumed causal factors.

In the main, this search for relationships, stressing differences in A/P, did not yield findings in support of the prevailing explanations set forth in Part I. We did find, however, that larger units, as a group, had lower administrative overhead. Furthermore, greatest size increase was associated with least administrative overhead increase. The magnitudes of administrative overhead appeared to be independent of the other variables tested.

We therefore take another direction in our search for explanations of the observed magnitudes of administrative overhead. In what respects are there similarities among industries and firms with respect to changes in these outlays?

Between 1899 and 1937 the sampled industries increased their administrative overhead outlays by varying amounts. At the same time, the large increments of administrative personnel did not occur in such a way as to alter seriously, over time, the distribution of industries when ranged according to the magnitude of their administrative overhead. The comparison of this distribution for 1899 and 1937 appears in Fig. 3.

In order to examine the behaviour underlying the maintenance of this orderly pattern we have arranged in Fig. 25 the data showing the changes in the administration and the production personnel of the sampled industries since 1899.

The solid vertical lines for each industry depict the degree of change in administration personnel, in percentages, from 1899 to 1937. These

percentages are read from the scale at the left. This is the same scale for reading percentage changes in production personnel shown for each industry by a broken vertical line. The sampled industries are arranged along the X-axis, according to whether their administration staffs increased or decreased in respect to production personnel. Those industries with declining ratios (A/P) appear to the left of the heavy vertical line, the others are to the right.

For each industry the degree of change in administration personnel divided by the degree of change in production personnel shows the acceleration of change in administration with respect to production outlays. This difference, in percentages between the degree of change in administration and the degree of change in production, is shown for each industry by the height of the fine line that passes through its vertical columns. The scale of relative acceleration, in per cent., appears at the right of the chart.

It is now clear that the industries have been ranged along the horizontal axis according to the increasing acceleration of change in administration personnel with respect to the production force. In the case of the industries with declining overhead outlays, at the left of the chart, increasing decline is shown from right to left.

Only at the extreme right end of the X-axis does this line of relative acceleration slope upward steeply. The industries which grew heavily in numbers of employees during the period reviewed—petroleum, steel, motor vehicles, electrical machinery—are found along the X-axis well before the steep upward rise in slope of the relative acceleration of administration overhead change with respect to production change.

This position of the growing industries relative to the others suggests that their growth did not have the effect of altering drastically the rather concentrated distribution of industries with respect to their administrative overheads as shown in Fig. 3.

There appears to have been considerable homogeneity among manufacturing firms with respect to the increase in administration relative to production outlays. We will make an explicit test of this hypothesis below.

1. The Growing Industries. Much of the increase in output of manufacturing industries, and of total personnel employed, is due to the large, growing industries which have expanded since the turn of the century. It is of interest, therefore, to inquire into the effect of these industries on the administrative overhead of all manufacturing. This is done by abstracting from the administration and production personnel aggregates for total manufacturing, in each census year, the data for motor vehicles, petroleum refining, electrical machinery, and steel. These industries are selected as representative of the industries that expanded since 1899.

In the following data we show the numbers of administration and production personnel employed in these industries, as percentages of these classes of personnel in all manufacturing industries at the given dates.

	Percentage of all administration personnel	*Percentage of all production personnel*
1899 . .	3·5	6·1
1909 . .	5·9	6·7
1923 . .	12·0	11·7
1929 . .	12·7	12·5
1937 . .	13·2	12·1

The following data show the A/P ratios for all manufacturing, and the same ratios with these expanding industries' data excluded.

	A/P total manufacturing	*A/P total manufacturing without expanding industries*
1899 . .	9·9	10·2
1909 . .	13·9	13·9
1923 . .	16·3	16·3
1929 . .	18·5	18·5
1937 . .	18·2	18·0

It is evident from the above that the growing industries characterized by intense mechanization and other attributes of modern manufacturing did not have the effect of skewing the ratio for all manufacturing despite the fact that the portion of employment due to these industries grew from 3·5 per cent. of total administration personnel in 1899 to 13·2 per cent. in 1937. At the same time the portion of total production personnel due to these industries doubled, from 6 per cent. to 12 per cent.

We may conclude from this that the dramatic rise of the new industries as represented by the four we have dealt with here does not account for the direction of change which occurred in the A/P ratio of all manufacturing. Apparently the same forces which operated to increase the A/P ratios of these growing industries were operative in the other manufacturing industries as well. The trend of administrative overhead appears to be independent of the changing industrial composition of manufacturing, as indexed by the expanded importance of the growing industries.

2. Homogeneity among Industries, 1899–1937. For the distribution of A/P ratios of our sampled industries in each year we have computed the coefficient of variation as a measure of degree of variability. For this

computation we utilized the mean of A/P values for each industry, weighting each ratio equally. From these data we obtain the mean deviation of the A/P ratios from their average value, and the coefficient of variation computed as

$$\frac{\textit{Mean Deviation}}{\textit{Mean}}$$

The coefficients of variation are:

1899 . .	52·8	1929 . .	39·8
1909 . .	47·4	1937 . .	47·0
1923 . .	41·8		

Apparently the degree of variability among industries with respect to administrative overhead declined persistently until 1929. By 1937 the trend reversed. A clue to the possible meaning of the increased variability of administrative overhead in 1937 as compared with 1929 is found in the fact that the administrative overhead of the large industries group and of the sample industries increased while the ratio of administration to production personnel decreased for all manufacturing.

This may be due to a deficiency in the data for 1937. Another possibility is the occurrence of a differentiation among manufacturing industries and firms with respect to their response to the depression and New Deal experience.

The nature of the distribution of A/P ratios over time is further illuminated by consideration of the coefficient of rank correlation for the A/P values of the sampled industries between the peak years of business activity under review. In the following data we present the years compared and the coefficient of rank correlation for the A/P values of the sampled industries in those years.

1899–1909 . .	0·86	1929–37 . . .	0·92
1909–23 . . .	0·87	1899–1937 . .	0·69
1923–29 . . .	0·88		

When the sampled industries were ranked from smallest to largest A/P ratio in each year, then compared for changes in rank, we obtained the indicated correlation coefficients. If the rank of the A/P values had been the same in 1909 as in 1899 the coefficient would have been 1·00. The coefficients obtained therefore reflect the degree of similarity between the rank of the sampled industries with respect to administrative overhead at the relevant census years.

It is striking that coefficients remain high and tend to increase. This suggests that over the period reviewed the tendency was towards maintaining or increasing the rigidity of the rank of industries with respect to their magnitudes of administrative overhead.

When our sampled industries are arranged in order of the magnitude of administrative overhead, they may be viewed moving, as a group, to higher overhead while largely retaining their rank order (coefficient of rank correlation). At the same time the degree of variation does not alter greatly in the long run (coefficient of variation).

3. Large and Small Industries and Firms. Another view of relative homogeneity of change in A/P ratios is afforded by comparison of a group of large industries with the total number of our sample and with all manufacturing. The large industries for these observations were selected on the basis of those employing 50,000 or more in 1937. Included are seventeen industries: agricultural implements, boots and shoes, paper, boxes, canned fruits and vegetables, cigars and cigarettes, cotton goods, electrical machinery, furniture, glass, meat packing, motor vehicles, paper and pulp, petroleum refining, printing and publishing, ship and boat building, steel, and woollen goods.

As a group these industries are characterized by relatively large establishments and firms. Included are industries which grew mainly after 1899, as well as industries that were already large in 1899. In 1937 these industries accounted for 438,000 administration employees and 2,800,000 production employees. These comprised an appreciable proportion of the 1,500,000 administration employees in total manufacturing, and the total of 8,600,000 production personnel in all manufactures.

Fig. 26 shows the relationship over time between: the A/P ratios of this group of selected large industries; the sampled industries group which includes the selected large industries; and the A/P ratios of total manufacturing.

Several relationships are apparent. The A/P ratios of all these groups increased at about the same rate from 1899 to 1937. At each census year, however, the group of large industries shows a lower administrative overhead than that of total manufacturing. This is consistent with our previous findings on the lower average A/P of large units. The roughly parallel lines of Fig. 26 also reflect the previous measures of homogeneous change in A/P ratios which we made for our sampled industries. We can now explain the lower ratio of the sampled industries group, compared with total manufacturing, that first appeared in Part II. This is evidently due to the presence within the sampled industries of the group of large industries which have been segregated out here.

PART VI

CONCLUSIONS

Without apparent design or announced intent, the business men charged with administering the manufacturing firms of the United States have devoted increasing resources to administration functions of their firms since the turn of the twentieth century.

During the period reviewed, 1899–1947, both the administration and production personnel in American manufacturing grew in number. At the same time the administration personnel per hundred of the production staff increased from an average of 9·9 to 22·2.

This trend in the rise of administrative overhead is partly obscured by the original census aggregates of industries' data due to the separate presentation of central office staffs in 1929 and in 1937, and of the non-factory personnel in 1937. The observation of the rise in administrative overhead for manufacturing industries was made possible by our additions to and rearrangement of the original census data.

The trend in administrative overhead appears to be independent of many factors that otherwise differentiate industries and firms. This is the affirmative meaning of the various negative correlations observed in Part IV, where relationships were examined over time between changes in administrative overhead and changes in presumably related variables.

The role of government controls in causing additions to administrative overhead appears to fit into this pattern. We do not know the percentage of administration man-hours devoted to fulfilling government requirements. It is evident, however, that complying with government controls and tax laws has affected virtually all manufacturing firms. However, the rising trend of administrative overhead was evident well before the institution of federal income taxation in 1914.

Over the period reviewed the industries, and by inference the grouped firms, of Fig. 26 tended to increase their administrative overhead at similar rates, as reflected by the rather parallel lines of increasing A/P ratios. The similarity among industries in the change of administrative overhead is further mirrored in the degree of variability among industries at each census year which did not increase despite the growing importance of the group of new, expanding industries. Moreover, the rank of industries according to the magnitude of their A/P ratios was impressively retained, as indicated by the coefficients of rank correlation in Part V.

The similarity of change in administrative overhead, coupled with the sustained advantage of the larger firms in having lower A/P ratios, are both reflected in the upward sloping lines of Fig. 26.

The lower administrative overhead of the large firm group in Fig. 26

is consistent with the distributions of industries and of firms in our charts of Part III pertaining to various measurements of size. The chart relating administrative expenditures to firms grouped by asset size (Fig. 8) shows that the largest asset-size firms have a manifest advantage with respect to lower administrative expenditures per dollar of production expense than was the case for the smaller firms portrayed. When viewed individually, within industries, the larger firms also show a lower average administrative overhead compared with small firms as a group in the same industry.

From the common feature of the charts on size in Part III it is evident that no one of these indices of size, but only their common feature, size itself, may be singled out as peculiarly responsible for the differential advantage of large units.

Furthermore, the persistent occurrence of relatively low administrative overhead in association with large-size units since 1899 indicates that increase in size may not be held responsible for the observed trend towards greater administrative overhead. The direct proof of this inference is the finding that large increase in the size of units has been associated with a relatively small increment of administrative overhead (Summary of Part IV). The meaning of this tendency appears from an examination of Fig. 26. Both small- and large-unit industries have tended towards parallel increases in administrative overhead. Unusual increase in size has meant relatively less increase in administrative overhead, hence moving to a lower level of the rising trend.

It has been demonstrated that the rise in administrative overhead is a pervasive feature in manufacturing industries. How can we account for the manifest increase in these overhead personnel and costs?

In our opinion the growth of administrative overhead (A/P ratio) would not be explicable on the assumption that an increasing number of man-hours were required to administer similar business operations in 1947 as compared with 1899. From this premiss we would have been led to the conclusion that the aggregate efficiency of administrative personnel had declined precipitously from 1899 to 1947, with more of such employees required to do the same work.

This view is not in keeping with the known mechanization and rationalization of office operations that has occurred during the period reviewed. Accounting machines, duplicators, mailing machines, systematization of filing, standardization of forms, improved office layout—all contributed to the efficiency of office operations.* The increase in administrative

* Regrettably, data are not available on office efficiency comparable to the man-hour productivity data for directly productional activities. While certain large firms have begun to apply industrial engineering methods to their office operations, these data are as yet

overhead, despite these changes, forces us to rule out the assumption that the functions of business administration have remained essentially what they were at the turn of the century.

We are thus led to the inference that the increase in administration personnel, and the failure of their number to decrease as a result of mechanization, is connected with the addition of *new functions* carried out by the administration personnel. Just as the increase in administrative overhead was not selectively correlated with any of the supposed causal factors considered in Parts III and IV, we may now infer that the increase in administrative *functions* was not selectively correlated with any of them.

The added administrative functions which are indexed by our measures of increased administrative overhead evolved pervasively and at a relatively uniform rate throughout manufacturing industry. The attention of business men has been directed to the increase in administrative costs as such. This emphasis has tended to obscure the proliferation of functions, which becomes evident primarily upon the addition of specially designated persons or departments.

Less known than the spectacular unfolding of market manipulation by advertising are the other changes that have occurred in the administration of firms. Pay-roll accounting, for example, has become a complicated operation as compared with the older régime of payment by the day or week. Under various incentive arrangements individual and group rates must be applied to recorded output. Bonus increments may be added or penalties for poor work deducted from the weekly pay-cheque. Social security, union, and other fees must be deducted from the computed pay for work done. When done by hand these operations are laborious and costly. Larger firms find it economical to install I.B.M. and comparable equipment. The computation of the pay-cheque in turn often rests upon detailed records of work done that must be kept by foremen or special recording clerks whose data are collated with other necessary information for pay-roll accounting. The detailed record-keeping of work done by workmen or work groups is in turn an outgrowth of the management effort to maximize and to control the range of cost that can be varied with the output.

The additional administration personnel executing such functions comprise the bulk additions to administrative overhead which we have observed. The trend in the number of these employees is the more

fragmentary. Students of productivity measurements have advised the writer that the measurement of the changing efficiency of administrative activities presents special problems, such as establishing units of measurement for the results of administrative work, changes in the character of the work done that introduces non-comparability in sequential observations, simultaneous changes in several aspects of office operations, making it difficult to isolate presumed causal factors.

interesting as an index of expanding administrative functions when the increasing mechanization of their work is taken into account.

The explanation of the rather homogeneous increase in the administrative type of overhead will be found, we suggest, in the growing variety of business activities which are being subjected to controls, both private and public. As administrators have sought to lessen the uncertainty of their prospects, by controlling more of the factors which determine the advantage of their plants and firms, they have attempted to control, in ever greater detail, production costs, intensity of work, market demands for products, and other aspects of firm operation.* Following this hypothesis, the evolution of the business process towards the expansion of controlled areas of activity by management comprises the basis for the additions to administrative functions and, thereby, the enlarged administration personnel.†

As we observed in Part I, many of the prevailing views on the rise of administrative expenditures have reflected an appraisal of this trend as a development specific to and substantially controllable by the individual firm. The unit of business management was apparently assumed to be the unit in terms of which the differences in administrative outlays occur, and may be explained, both at one time and in the process of change-over time.

Our findings suggest that with respect to change-over time, measured in decades, administrative overhead is not a problem of the firm, for the increases in the A/P ratios of industries, and thereby firms, appear to be characterized by similarities more so than by differences. This means that in the long run, if the trend of 1899–1947 in the evolution of the business process is maintained, business men and others must assume increasing administrative 'costs which are not traced to units of output, or do not vary with output', and must plan accordingly.

At given times and in the short run, however, our findings suggest a

* The reader interested in this aspect of the problem is invited to scrutinize, as an example of new functions added to administration, the account of 'Developments in Cost Accounting Practice in a Large Manufacturing Company during the Last Half Century'. This history of the proliferation of accounting functions appears as an Appendix to the collection of lectures by Charles A. Heiss on *Accounting in the Administration of Large Business Enterprises*. The expansion of accounting functions in manufacturing firms from the simple records and the limited number of reports of 1900 to the elaborate track-keeping and reporting routines in current practice is set forth with great clarity.

† The administration personnel in manufacturing and similar man-hours in other sectors of the economy are overhead with respect to the output operations of productional personnel. Therefore the administrative type of man-hours may become an increasing proportion of the labour force without diminishing *per capita* available output only if the productivity of the directly productional labour force increases sufficiently to compensate for the shift of man-hours to various administrative functions.

While our data have been drawn from American industry it may be that our principal findings have bearing on the experience of other economies. Attention is directed to Table I, which reflects the rise in administrative overhead in other lands.

range of possible administrative overheads for any given firm. The upward sloping lines of Fig. 26 are average values of overlapping distributions. In the charts on size relationships of Part III it is evident that while the larger firms, as a group, have lower administrative overhead than small firms, many individual small firms also occupy this advantageous position of the larger units, low on the scale of administrative overhead. In the short run, therefore, it appears that skill in organization and management can make an appreciable difference in securing lower administrative overhead.

If the trend of 1899–1947 continues, the net advantage of a firm may therefore be secured by riding the upward trend of administrative overhead at a persistently lower level with respect to others.

DEPARTMENT OF INDUSTRIAL ENGINEERING
COLUMBIA UNIVERSITY, U.S.A.

1949

APPENDIX: TABLE I

Sampled Manufacturing Industries: Administration and Production Personnel, 1899–1937

Industry	1899			1909			1923			1929			1937		
	Administration	Production	A/P %	Administration	Production	A/P %	Administration	Production	A/P %	Administration	Production	A/P %	Administration	Production	A/P %
Agricultural implements	10,359	46,895	22·1	9,445	50,783	18·6	6,132	31,021	19·8	7,638	41,716	18·3	15,986	77,559	20·6
Bags, other than paper	371	3,957	9·4	834	8,004	10·4	1,823	11,598	15·7	1,698	11,879	14·3	1,538	12,115	12·7
Bags, paper	358	2,007	17·8	450	3,233	13·9	864	4,695	18·4	882	6,179	12·6	1,111	10,370	10·7
Bookbinding and blank books	1,621	16,516	9·8	3,227	20,471	15·8	3,612	21,172	17·1	4,403	25,092	17·6	4,956	25,687	19·3
Boots and shoes	8,858	143,937	6·2	15,122	185,725	8·1	23,534	217,383	10·8	22,578	205,873	11·0	18,235	215,541	8·5
Boxes, paper	1,772	28,057	6·3	3,646	39,921	9·1	7,752	57,189	13·6	8,020	55,874	14·4	10,532	65,351	16·1
Boxes, wooden, except cigar	1,506	22,497	6·7	2,883	35,993	8·0	3,442	39,412	8·7	2,808	30,773	9·1	2,353	26,138	9·0
Buttons	472	8,818	5·4	1,317	16,686	7·9	1,293	11,986	10·8	957	9,097	10·5	1,225	12,121	10·1
Canned fish	795	12,803	6·5	1,106	10,131	10·9	1,509	9,294	16·2	1,344	13,676	9·8	2,059	18,305	11·3
Canned fruits and vegetables	4,984	45,696	10·9	8,787	51,970	16·9	10,491	73,416	14·3	12,437	99,743	12·5	17,784	137,737	12·9
Carpets and rugs, wool	742	28,466	2·6	1,332	33,374	4·0	1,700	35,224	4·8	2,722	32,628	8·3	2,880	30,785	9·4
Cash registers and business machines	330	2,070	15·9	1,780	7,468	23·8	3,480	14,975	23·2	6,208	16,844	36·9	8,903	23,636	37·7
Chocolate	299	1,324	22·6	573	2,831	20·2	1,507	6,881	21·9	821	6,251	13·1	1,187	7,404	16·0
Cigarettes and cigars	12,578	111,570	11·3	19,630	148,165	13·3	14,209	131,613	10·8	11,100	106,067	10·5	6,657	82,307	8·1
Coke-oven products	939	17,023	5·5	1,902	29,323	6·5	3,289	28,378	11·6	2,953	20,554	14·4	2,520	20,605	12·2
Cooperage	2,023	24,123	8·4	1,972	20,209	9·8	1,232	12,195	10·1	1,121	10,842	10·3	762	9,666	7·9
Cordage and twine	474	13,152	3·6	899	14,659	6·1	1,530	16,393	9·3	1,417	14,897	9·5	1,281	14,053	9·1
Corn products	607	5,997	10·1	1,011	4,816	21·0	1,214	6,540	18·6	2,074	6,734	30·8	1,802	7,014	25·7
Corsets	935	12,417	7·5	2,001	17,609	11·4	3,018	16,154	18·7	2,244	13,713	16·4	2,631	16,431	16·0
Cotton goods	4,907	298,123	1·7	8,204	371,333	2·2	14,162	471,621	3·0	14,802	424,961	3·5	13,239	422,352	3·1
Drugs and medicines	9,189	20,123	45·7	16,805	24,296	69·2	13,714	26,727	51·3	16,866	27,420	61·5	14,073	24,243	58·1
Electrical machinery	5,259	42,205	12·5	18,124	87,475	20·7	73,927	235,186	31·4	80,826	328,954	24·6	68,808	257,830	26·7
Electroplating	386	2,357	16·4	564	2,994	18·8	866	3,597	24·1	1,150	6,163	18·7	1,343	8,499	15·8
Explosives	779	4,513	17·3	773	6,284	12·3	2,146	6,394	33·6	2,148	5,628	38·2	2,402	5,408	44·4
Fertilizers	1,892	11,761	16·1	3,478	18,471	18·8	4,844	18,647	26·0	4,833	20,995	23·0	5,069	20,991	24·2
Flour	11,173	37,877	29·5	19,316	46,738	41·3	15,407	37,766	40·8	11,295	28,695	39·4	9,808	27,322	35·9
Furniture	7,466	88,214	8·5	13,798	124,701	11·1	21,155	168,970	12·5	25,608	194,340	13·2	22,579	170,884	13·2
Furs, dressed	100	889	11·3	173	1,298	13·3	904	5,280	17·1	867	5,254	16·5	607	6,366	9·5
Glass	2,353	52,903	4·5	3,618	68,954	5·3	6,319	73,360	8·6	6,539	67,542	9·7	9,115	79,063	11·5
Hats, fur felt	830	18,984	4·4	1,895	25,196	7.5	1,806	16,777	10·8	1,697	16,575	10·2	1,083	15,956	6·8
Ice, manufactured	1,754	7,103	24·7	4,460	16,647	26·8	7,771	27,438	28·3	8,017	32,764	24·5	11,521	19,311	34·7
Ink, printing	279	529	52·7	714	1,140	62·6	897	1,993	45·0	1,131	2,466	45·9	1,368	2,809	48·7
Jute goods	94	4,512	2·1	232	6,669	3·5	375	6,051	6·2	396	4,933	8·0	495	6,523	7·6

Lighting equipment	1,464	11,408	12·8	3,829	19,076	20·1	2,844	12,412	22·9	4,894	23,715	20·6	4,183	21,847	19·2
Liquors, vinous	508	1,327	38·3	697	2,029	34·4	139	532	26·1	61	192	31·8	1,102	3,118	35·3
Lithographing	1,617	13,114	12·3	2,760	15,172	18·2	4,214	16,382	25·7	4,694	19,025	24·7	6,140	24,146	25·4
Locomotives, not built in railroad shops	743	19,046	3·9	2,032	14,912	13·6	2,911	30,672	9·5	2,303	11,047	20·9	2,681	9,002	29·8
Matches	69	2,050	3·4	566	3,654	15·5	462	4,712	9·8	362	3,760	9·6	445	5,261	8·5
Mattresses	1,305	8,103	16·1	2,352	11,756	20·0	3,480	14,582	23·9	3,013	17,531	17·2	4,242	19,472	21·8
Meat packing, wholesale	10,649	69,596	15·3	18,158	90,557	20·1	33,033	133,375	24·8	28,015	122,936	22·8	37,382	127,843	29·2
Motor vehicles	296	2,269	13·1	6,806	51,335	13·3	27,654	241,373	11·5	33,345	226,134	14·8	32,962	194,531	16·9
Needles	154	2,672	5·8	326	4,651	7·0	833	6,841	12·2	776	6,246	12·4	1,718	9,584	17·9
Oil, cake and meal, cottonseed	1,610	11,048	14·6	4,147	17,126	24·2	3,220	12,786	25·2	3,524	15,842	22·2	3,500	16,613	21·1
Oilcloth	50	514	9·7	67	978	6·9	165	1,203	13·7	257	1,412	18·2	253	1,269	19·9
Paper and pulp	3,150	49,861	6·3	5,370	76,103	7·1	12,358	120,709	10·2	15,400	128,070	12·0	16,879	137,815	12·3
Pens, fountain	184	1,194	15·4	625	1,949	32·1	895	4,324	20·7	783	4,618	17·0	891	4,356	20·5
Petroleum refining	1,224	12,222	10·0	2,690	13,950	19·3	16,074	66,749	24·1	28,727	80,602	35·6	37,700	83,198	45·3
Photo-engraving	686	2,893	23·7	1,817	5,459	33·3	3,101	8,670	35·8	4,382	12,469	35·1	4,993	12,492	40·0
Pipes, tobacco	176	1,641	10·7	280	2,810	10·0	321	2,413	13·3	262	1,685	15·6	213	2,385	8·9
Printing and publishing, book and music	14,148	72,316	19·6	28,842	114,895	25·1	43,947	135,584	32·4	51,941	155,404	33·4	50,949	145,194	35·1
Salt	446	4,814	9·3	607	4,973	12·2	1,074	6,825	15·7	757	5,459	13·9	491	4,616	10·6
Sausage and sausage casings	250	1,010	24·8	585	2,159	27·1	1,405	4,855	28·9	1,558	6,236	25·0	2,844	10,516	27·0
Screw machine products	257	3,537	7·3	473	5,147	9·2	1,693	13,289	12·7	2,810	19,934	14·1	3,469	21,361	16·2
Ship and boat building	2,032	47,374	4·3	3,711	41,237	9·0	5,891	62,466	9·4	6,107	55,261	11·1	8,009	62,419	12·8
Smelting and refining, copper, lead, zinc	1,128	24,519	4·6	2,334	29,711	7·9	4,305	38,847	11·1	5,754	30,981	18·6	6,240	29,815	20·9
Soap	3,031	9,780	31·0	5,229	13,163	39·7	7,287	17,053	42·7	6,086	14,406	42·3	5,385	14,042	38·4
Sporting and athletic goods	234	2,291	10·2	594	5,398	11·0	1,480	9,736	15·2	1,890	10,848	17·4	1,793	11,444	15·7
Steel works, blast furnace	9,296	222,575	4·2	25,270	278,552	9·1	45,050	424,942	10·6	55,134	419,542	13·1	67,853	502,420	13·5
Structural metal work	2,219	20,998	10·6	6,156	40,734	15·1	11,762	51,914	22·7	14,024	55,313	25·4	9,318	39,074	23·9
Sugar, beet	351	1,970	17·8	1,185	7,204	16·5	2,031	7,571	26·8	1,727	7,496	23·0	2,479	9,366	26·5
Surgical appliances	552	1,900	29·1	1,406	4,399	32·0	1,881	5,438	34·6	2,355	8,017	29·4	2,210	8,517	26·0
Trunks and suitcases	933	7,189	13·0	2,024	11,398	17·8	2,007	11,672	17·2	1,867	11,516	16·2	1,166	8,789	13·3
Umbrellas and canes	759	5,812	13·1	883	5,621	15·7	818	3,878	21·1	542	2,918	18·6	327	3,124	10·5
Wall paper	526	4,186	12·6	704	4,042	17·4	735	5,417	13·6	716	4,705	15·2	656	4,546	14·4
Washing and ironing machines	165	1,570	10·5	421	1,873	22·5	1,676	6,159	27·3	1,717	8,193	21·0	1,590	9,304	17·1
Window shades	406	1,915	21·2	743	4,027	18·5	1,126	6,121	18·4	1,125	4,855	23·2	1,047	3,274	32·0
Wood preserving	58	482	12·0	472	2,403	19·6	1,006	6,522	15·4	1,416	13,080	10·8	984	12,404	7·9
Woollen goods (woven)	2,657	69,304	3·8	2,351	52,420	4·5	3,785	72,508	5·2	4,113	58,531	7·0	3,796	61,954	6·1
Wool pulling	50	490	10·2	109	649	16·8	97	705	13·8	75	599	12·5	88	799	11·0
TOTALS	159,867	1,850,408		306,692	2,465,089		506,684	3,414,563		562,112	3,463,700		591,890	3,516,292	

REFERENCES TO TEXT

1. J. M. Clark, *The Economics of Overhead Costs* (Chicago: University of Chicago Press, 1923), ix.
2. *Recent Social Trends in the United States* (New York: McGraw-Hill, 1933), 289.
3. The definitions of the personnel categories of the Census of Manufactures are found in the introductory section of each of the volumes of reports. In the volumes on manufactures for the decennial censuses, the reporting form that had been used to collect the data is found at the back of the general volume report on manufactures. Critical materials on the meaning of the categories of the Census of Manufactures will be found in the studies of S. Fabricant on *Output of Manufacturing Industries, 1899–1937* (1940), and *Employment in Manufacturing, 1899–1939* (1942), published by the National Bureau of Economic Research in New York City.
4. The treatment of proprietors was complicated by the absence of a clearly measurable basis for allocating them to administration or production personnel. Qualitative data make it apparent that proprietors are generally engaged in both administrative and productional activities. We have sought to minimize the possible errors in estimating the apportionment of their man-hours by allocating half the proprietors to the administration group and half to the production group.

   For the Census of 1929 and 1937 the Bureau of the Census did not indicate the numbers of central office personnel in the various manufacturing industries. Only aggregate data on these personnel were made available. We attempted to make up for this deficiency in the census data by carrying out a direct questionnaire survey of the large firms included in our sampled industries. The response to our request for 1929 and 1937 central office personnel data from manufacturing managements was excellent, and made it possible to form a reliable, conservative estimate of such personnel in industries where they are of importance. These data were added as a correction to the published reports of the Bureau of the Census.
5. U.S. Bureau of the Census, *Twelfth Census of the United States: 1900, Manufactures*, vol. vii (Washington: U.S. Government Printing Office, 1902), 635, 636.
6. For such data see the appendixes to the volumes by S. Fabricant, op. cit.
7. See S. Fabricant, *Output of Manufacturing Industries*, op. cit., p. 375.
8. These data were drawn from the *Survey of American Listed Corporations* published by the Federal Securities and Exchange Commission. The volumes so titled include data on profit and loss accounts for the manufacturing firms whose securities are listed on the American securities exchanges, beginning with 1934 data and continuing until 1947. For the 1937 data of the S.E.C. special compilations were prepared in two volumes of *Statistics of American Listed Corporations*. These included various tabulations of the original data on assets and liabilities, and profit and loss reported to the Commission.
9. J. C. Baker, 'Executive Compensation Payments by Large and Small Industrial Companies', *Quarterly Journal of Economics*, liii (1939), 404–34.
10. U.S. Bureau of the Census, *Biennial Census of Manufactures: 1923* (Washington: U.S. Government Printing Office, 1926), 1201.
11. U.S. Bureau of the Census, *Census of Population, 1930, General Report on Occupations* (Washington: U.S. Government Printing Office, 1933), 412–586.
12. C. A. Bliss, *The Structure of Manufacturing Production* (New York: National Bureau of Economic Research, 1939), 91.
13. S. Fabricant, *Employment in Manufacturing, 1899–1939* (New York: National Bureau of Economic Research, 1942).

14. C. Dreyfuss, *Occupation and Ideology of the Salaried Employee*, translated by Eva Abramovitch (New York: W.P.A. Translation Project at Columbia University, 1938), 4.
15. T. Parsons, *Structure of Social Action* (New York: McGraw-Hill, 1937), 506–7.
16. The President of the General Motors Corporation, cited in Temporary National Economic Committee, Monograph No. 13, pp. 113–14.
17. M. E. Dimock, *The Executive in Action* (New York: Harper, 1945), 258–9.
18. M. E. Dimock and H. K. Hyde, *Bureaucracy and Trusteeship in Large Corporations*, Temporary National Economic Committee, Monograph No. 11, U.S. Senate, 76th Congress, 3rd Session, 1940, p. 33.
19. C. Dreyfuss, op. cit., p. 18.
20. Ibid., p. 22.
21. J. A. Schumpeter, *Capitalism, Socialism, and Democracy* (New York: Harper, 1942), 207.
22. M. E. Dimock and H. K. Hyde, op. cit., p. 34.
23. W. E. Moore, *Industrial Relations and the Social Order* (New York: Macmillan, 1947), 108.

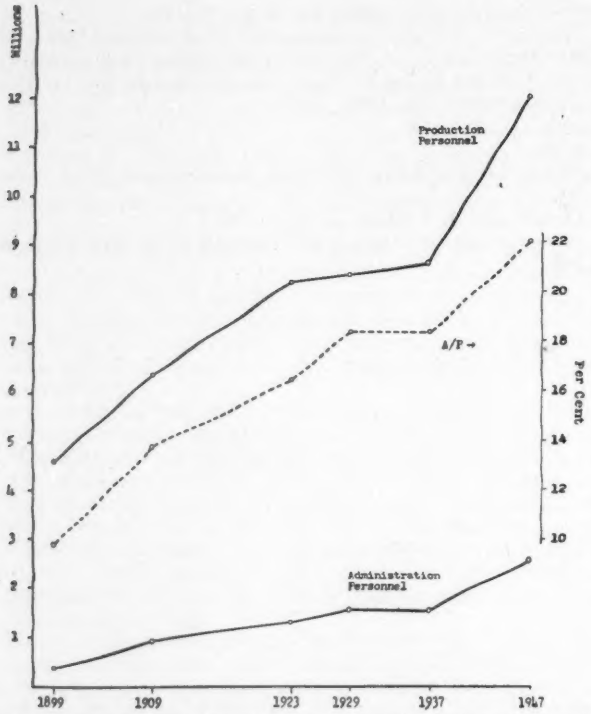


FIG. 1. All Manufacturing Industries. Administration and Production Personnel, 1899–1947.

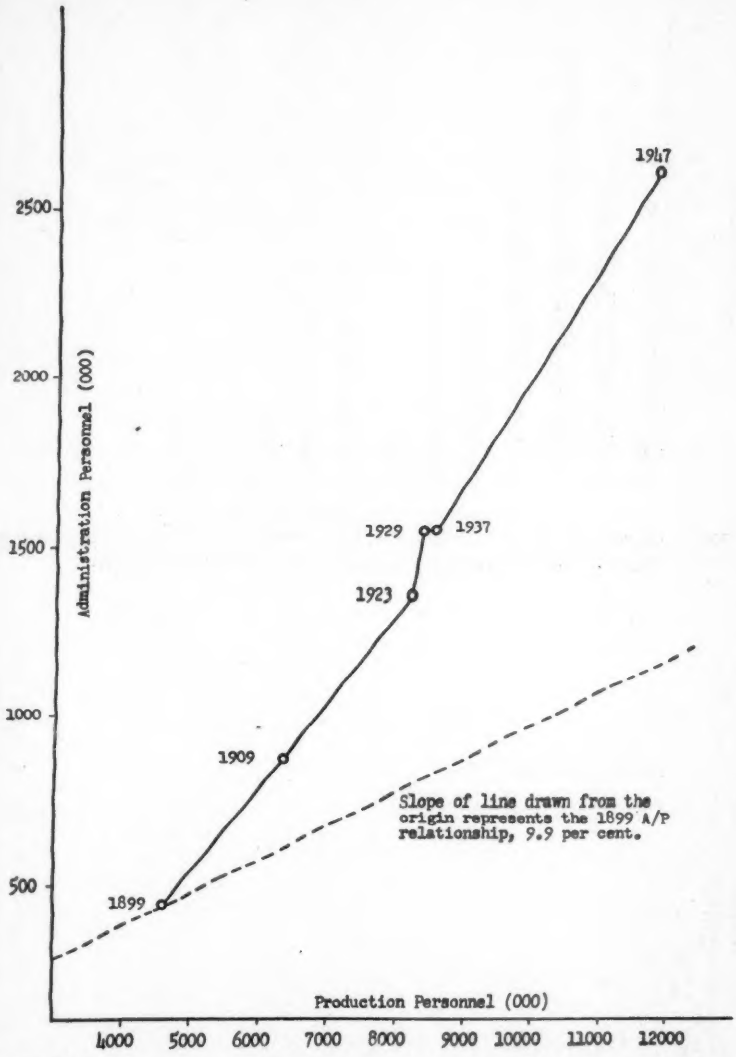


FIG. 2. All Manufacturing Industries. Change in Administration Personnel, in relation to Change in Production Personnel, 1899–1947.

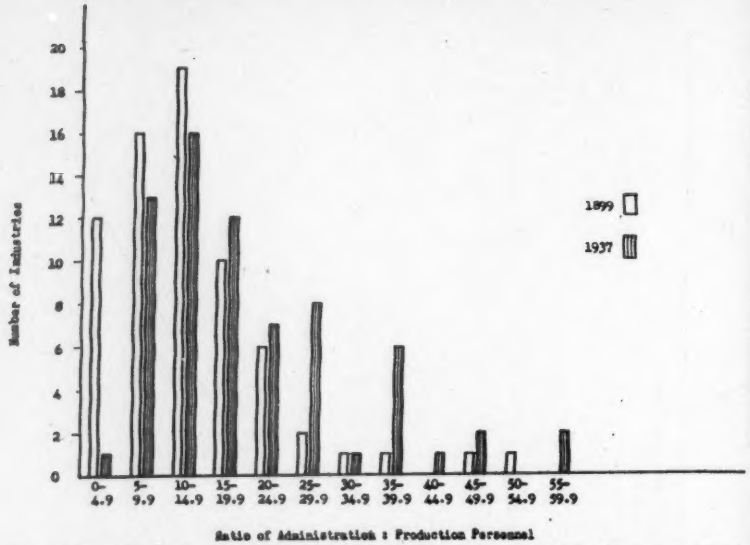


FIG. 3. Sampled Manufacturing Industries. Number of Industries, according to Ratio of Administration: Production Personnel, 1899 and 1937.

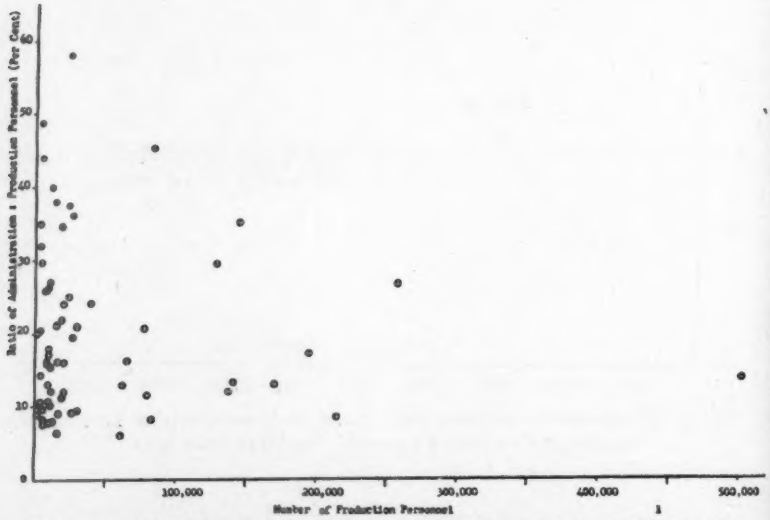


FIG. 4. Sampled Manufacturing Industries. Relation of Ratio of Administration: Production Personnel, and Number of Production Personnel, 1937.

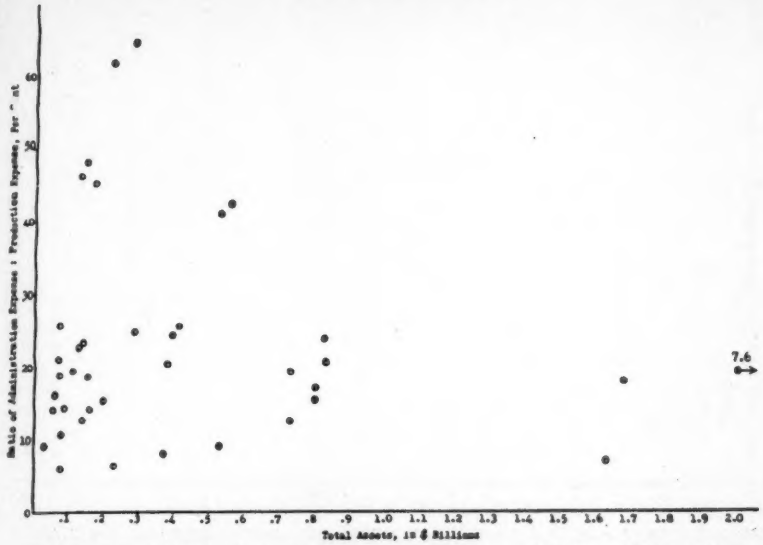


FIG. 5. Selected Manufacturing Industries. Relation of Ratio of Administration Expense: Production Expense, and Total Assets of the Industry (Firms registered with SEC), 1937.

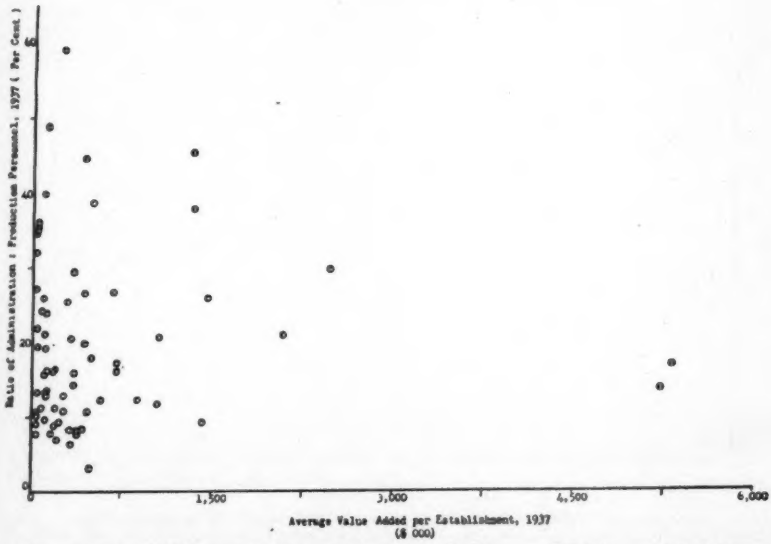


FIG. 6. Sampled Manufacturing Industries. Relation of Ratio of Administration: Production Personnel, and Average Value Added per Establishment, 1937.

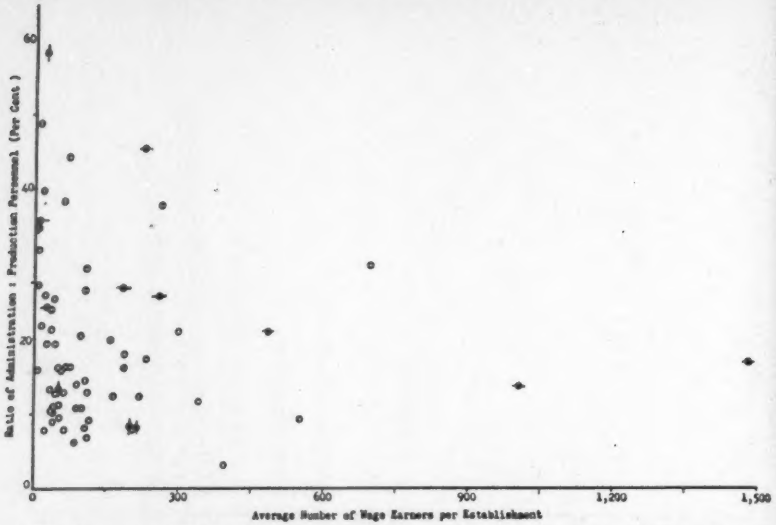
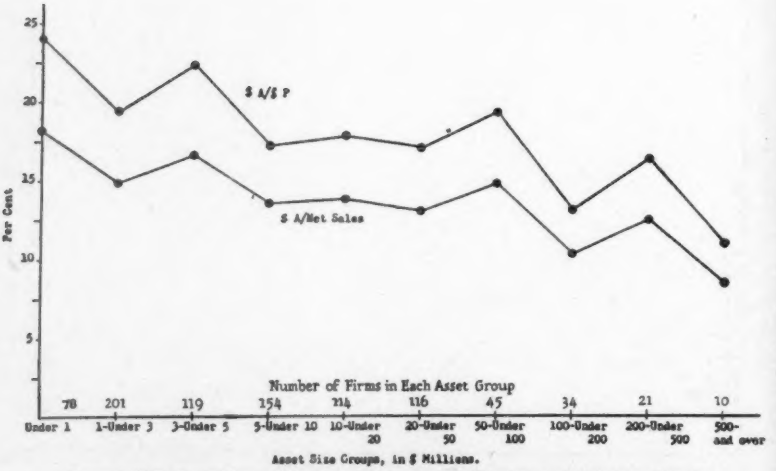


FIG. 7. Sampled Manufacturing Industries. Relation of Ratio of Administration: Production Personnel, and Average Number of Wage Earners per Establishment, 1937.



Source: U.S. Securities and Exchange Commission, 'Statistics of American Listed Corporations', 1941, Pt. 2, pp. 171 ff.

FIG. 8. Relation of Administration Expense, Production Expense, and Net Sales, for 892 Manufacturing Firms Grouped by Asset Size, 1937.

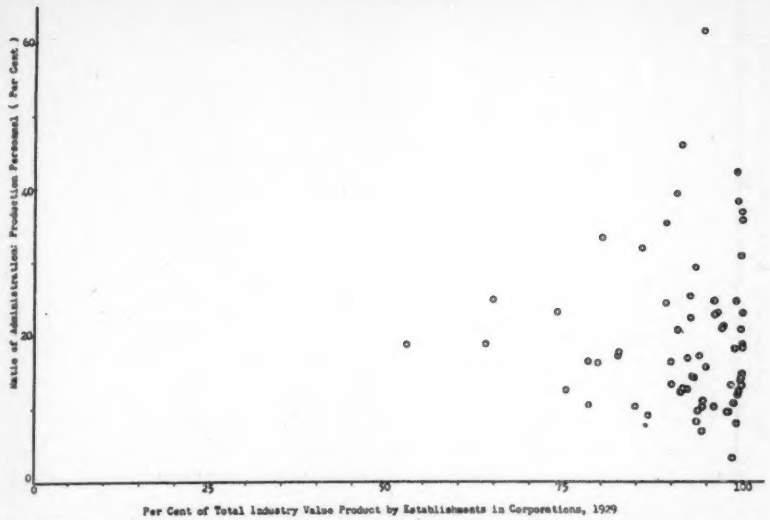


FIG. 9. Sampled Manufacturing Industries. Relation of Ratio of Administration: Production Personnel, 1929, and Per Cent. of Total Industry Value Product by Establishments in Corporations, 1929.

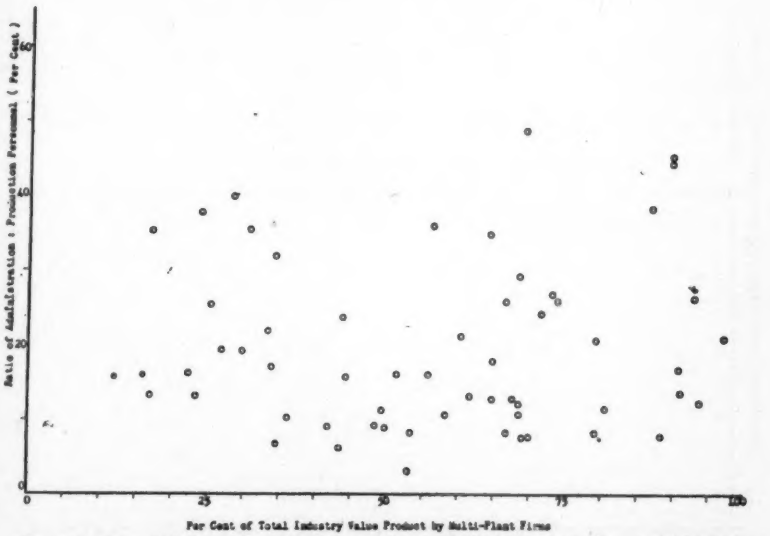


FIG. 10. Sampled Manufacturing Industries. Relation of Ratio of Administration: Production Personnel; Per Cent. of Total Industry Value Product by Multi-Plant Firms, 1937.

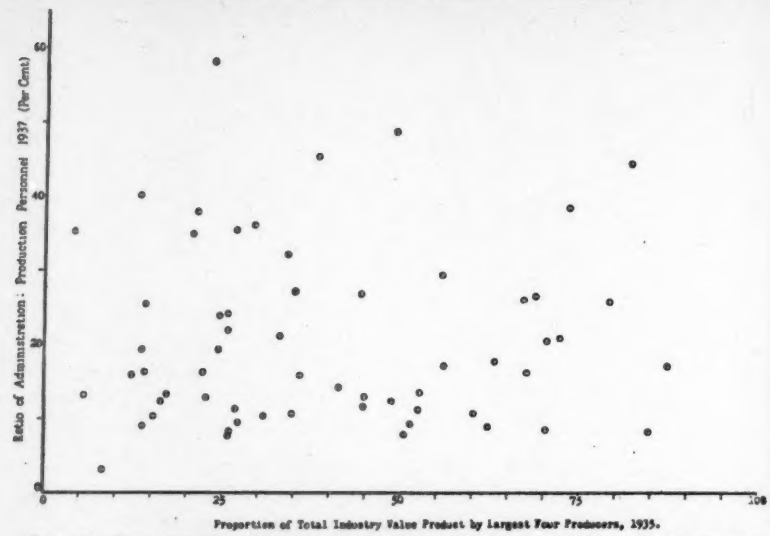


FIG. 11. Sampled Manufacturing Industries. Relation of Ratio of Administration: Production Personnel, 1937, and Proportion of Total Industry Value Product by Four Largest Producers, 1935.

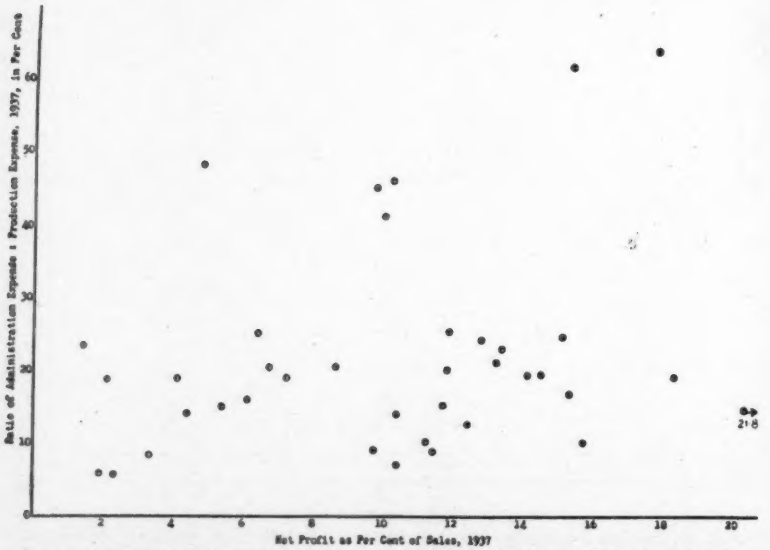


FIG. 12. Selected Manufacturing Industries (SEC). Relation of Ratio of Administration Expense: Production Expense, and Net Profit as a Per Cent. of Sales, 1937.

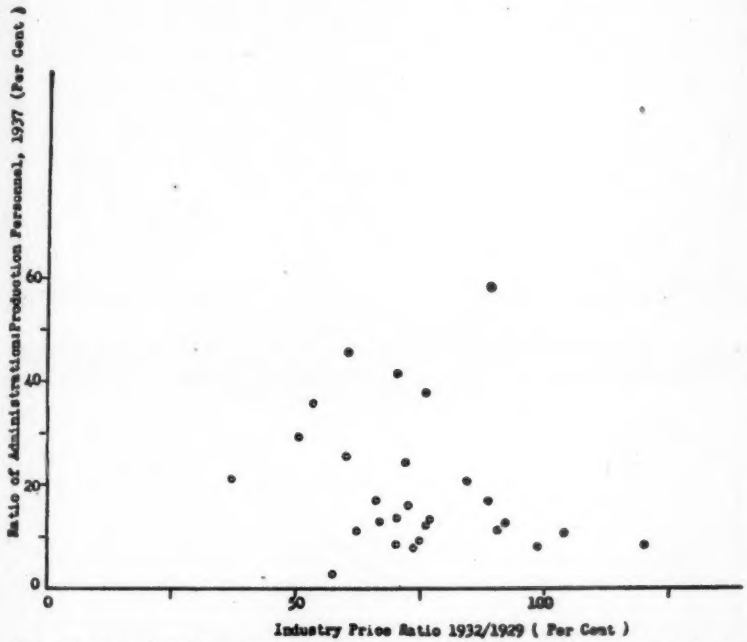


FIG. 13. Sampled Manufacturing Industries. Relation of Ratio of Administration: Production Personnel, 1937, and Industry Price Ratio 1932/1929.

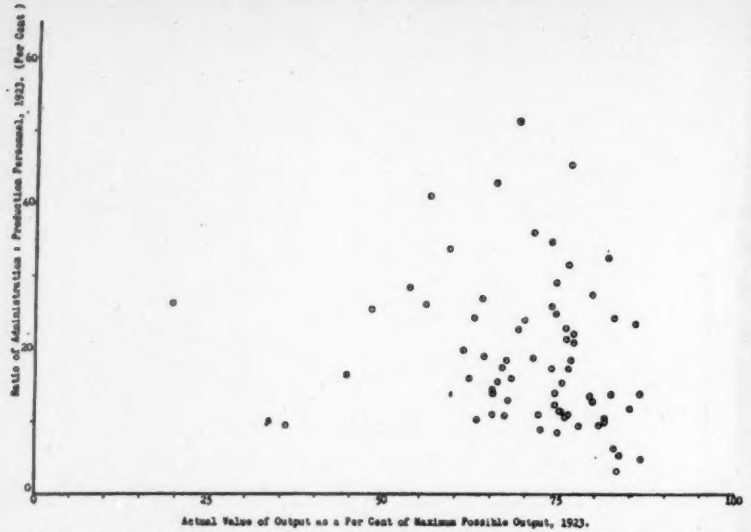


FIG. 14. Sampled Manufacturing Industries. Relation of Ratio of Administration: Production Personnel, 1923, and Actual Value of Output as a Per Cent. of Maximum Possible Output, 1923.

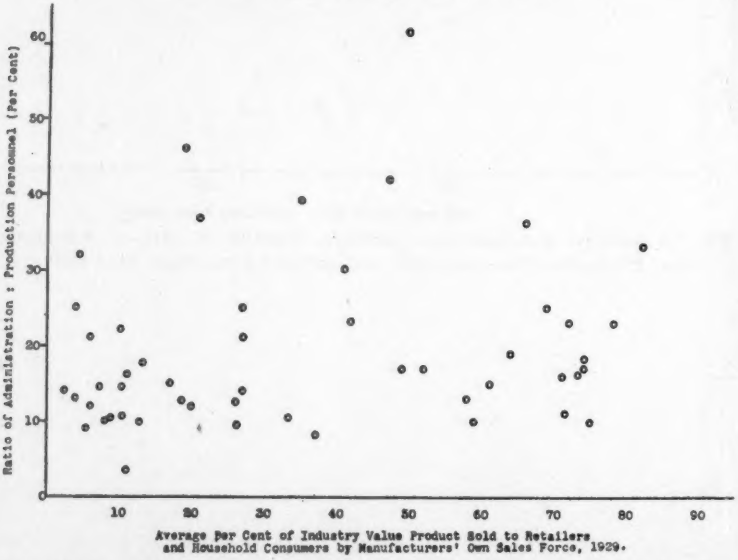


FIG. 15. Sampled Manufacturing Industries. Relation of Ratio of Administration: Production Personnel (Per Cent.), and Average Per Cent. of Industry Value Product Sold to Retailers and Household Consumers by Manufacturers' Own Sales Force, 1929.

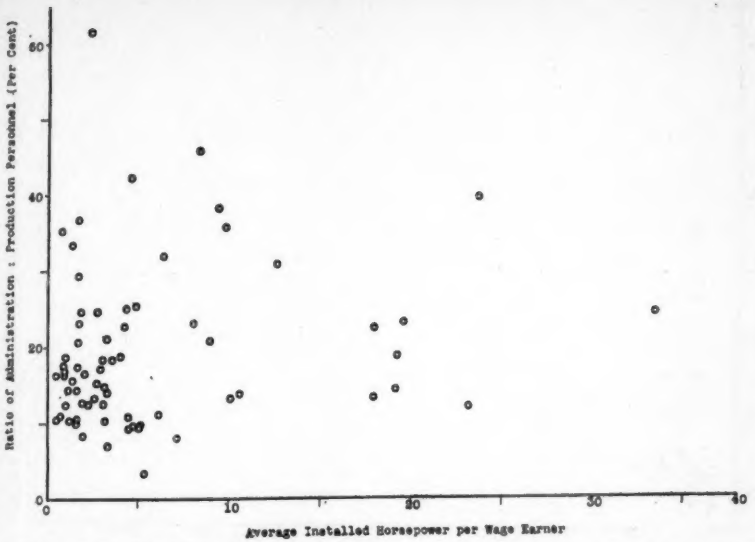


FIG. 16. Sampled Manufacturing Industries. Relation of Ratio of Administration: Production Personnel, and Average Installed Horsepower per Wage Earner, 1929.

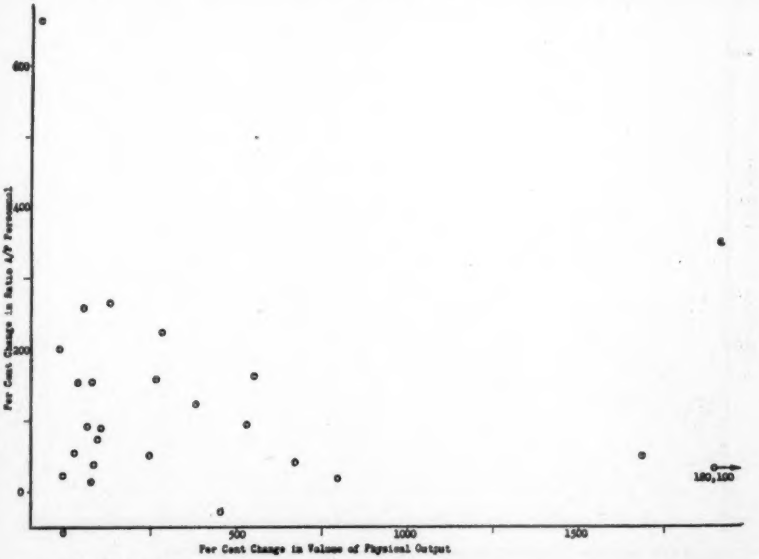


FIG. 17. Sampled Manufacturing Industries. Relation of Change in Ratio of Administration: Production Personnel, with Change in Volume of Physical Output, 1899–1937.

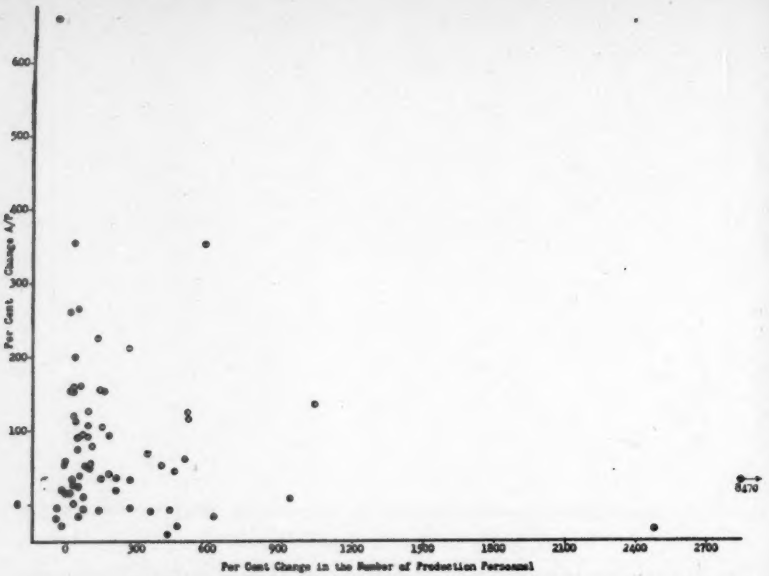


FIG. 18. Sampled Manufacturing Industries. Relation of Change in the Ratio of Administration: Production Personnel, and Change in the Number of Production Personnel, 1899–1937.

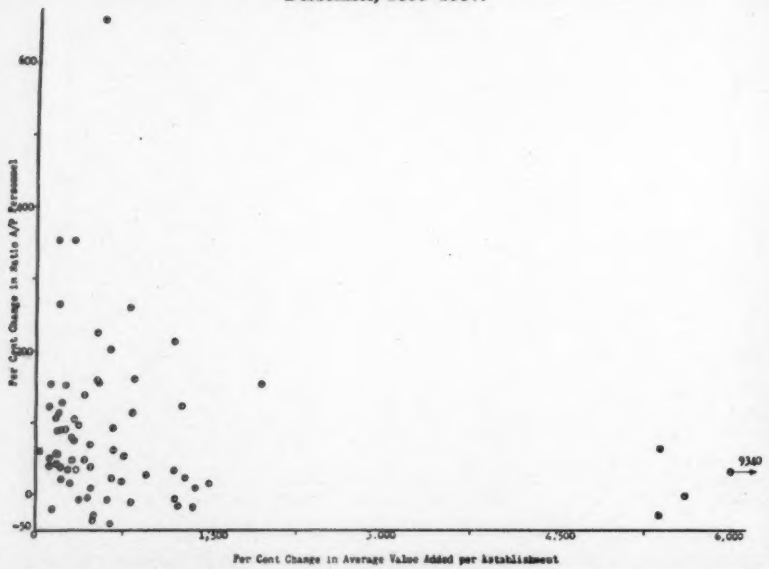


FIG. 19. Sampled Manufacturing Industries. Relation of Change in the Ratio of Administration: Production Personnel, with Change in Average Value Added per Establishment, 1899–1937.

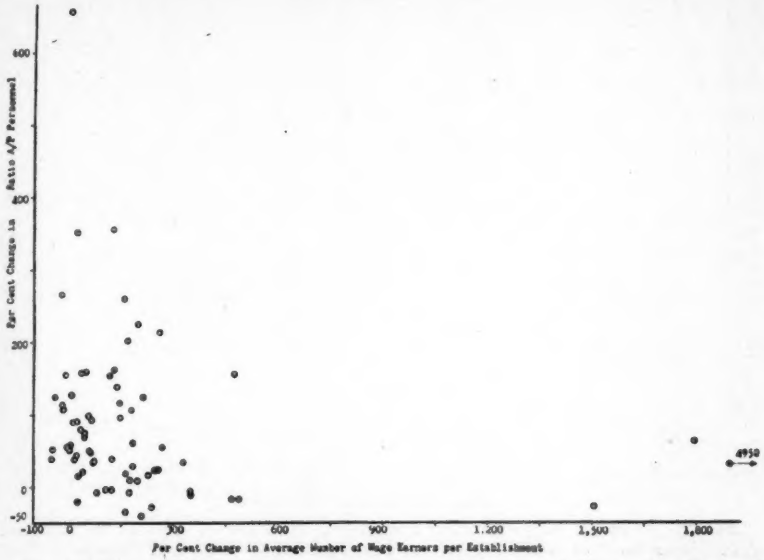


FIG. 20. Sampled Manufacturing Industries. Relation of Change in Ratio of A/P Personnel, with Change in Average Number of Wage Earners per Establishment, 1899–1937.

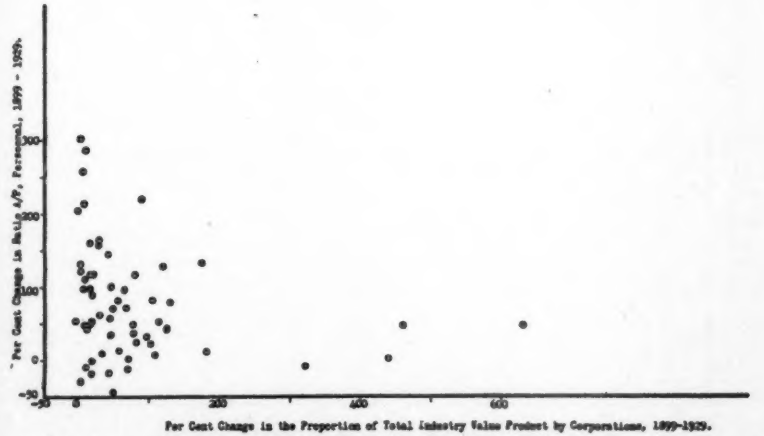


FIG. 21. Sampled Manufacturing Industries. Relation of Change in the Ratio of A/P Personnel, with Change in the Proportion of Total Industry Value Product by Corporations, 1899–1929.

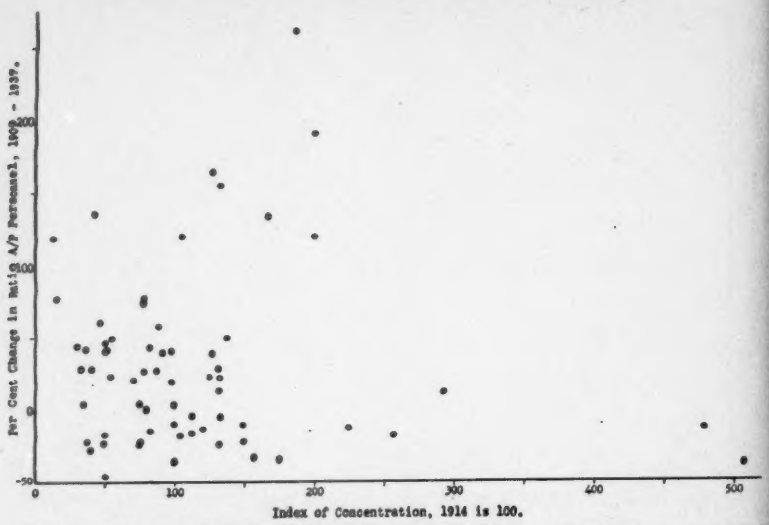


FIG. 22. Sampled Manufacturing Industries. Relation of Change in Ratio of Administration Personnel: Production Personnel, 1909–1937, and Change in Concentration, 1914–1937.

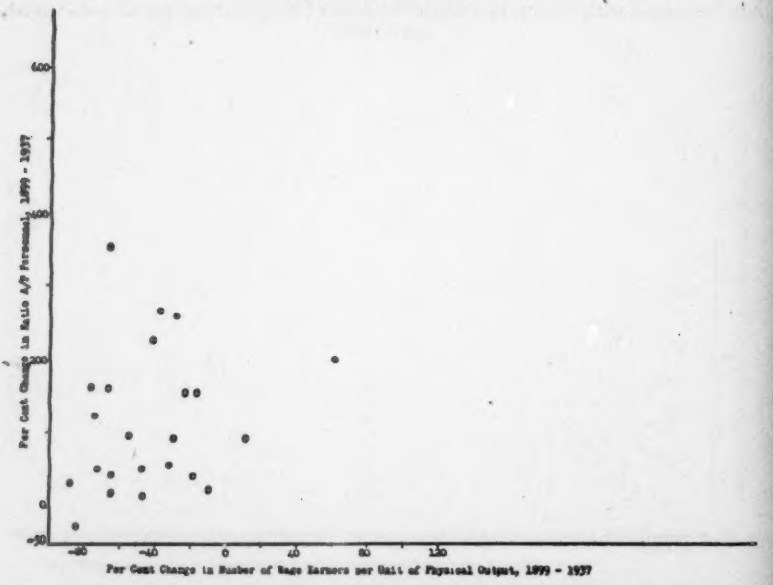
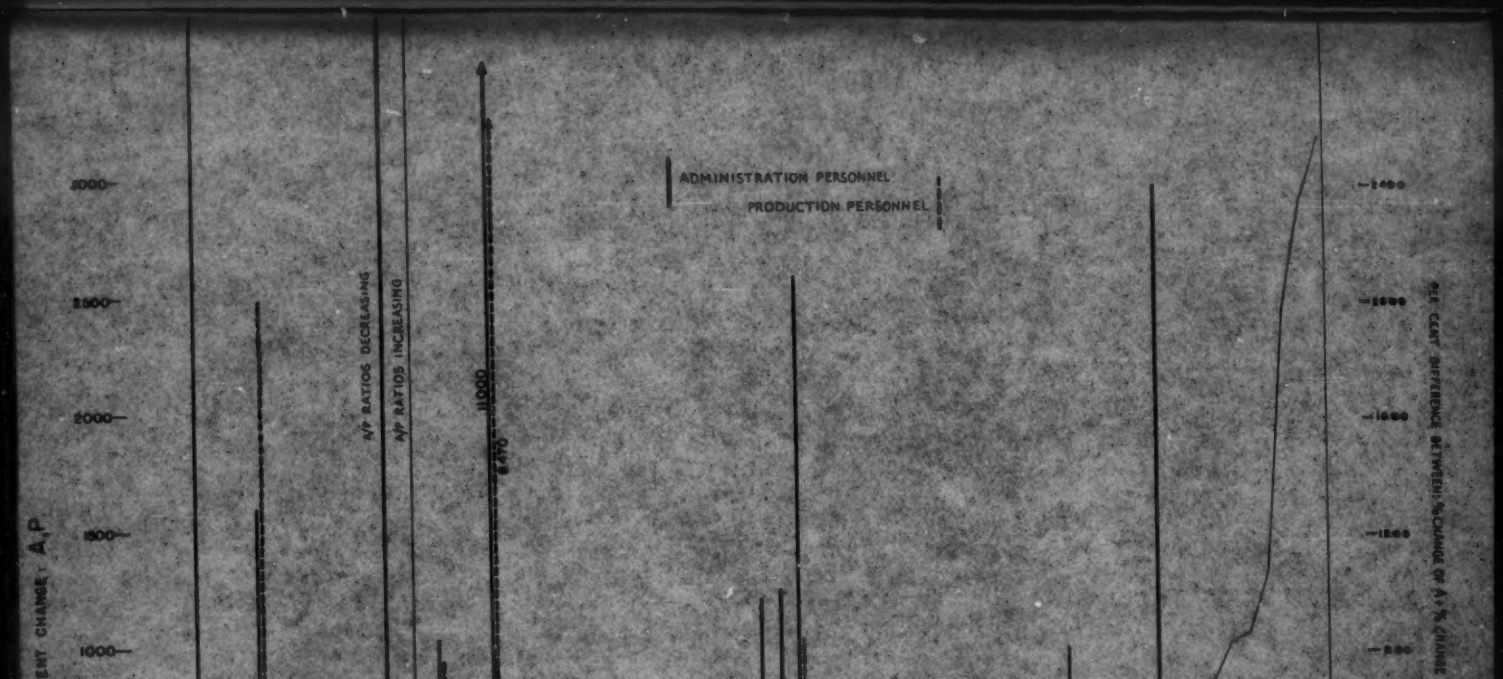


FIG. 23. Sampled Manufacturing Industries. Relation of Change in Ratio of Administration: Production Personnel, with Change in Number of Wage Earners per Unit Physical Output, 1899–1937.


ADMINISTRATION PERSONNEL
PRODUCTION PERSONNEL
A/P RATIOS DECREASING
A/P RATIOS INCREASING
11000
6470
2500
2000
1500
1000
PER CENT DIFFERENCE BETWEEN % CHANGE OF A & % CHANGE
ENT CHANGE: A, P

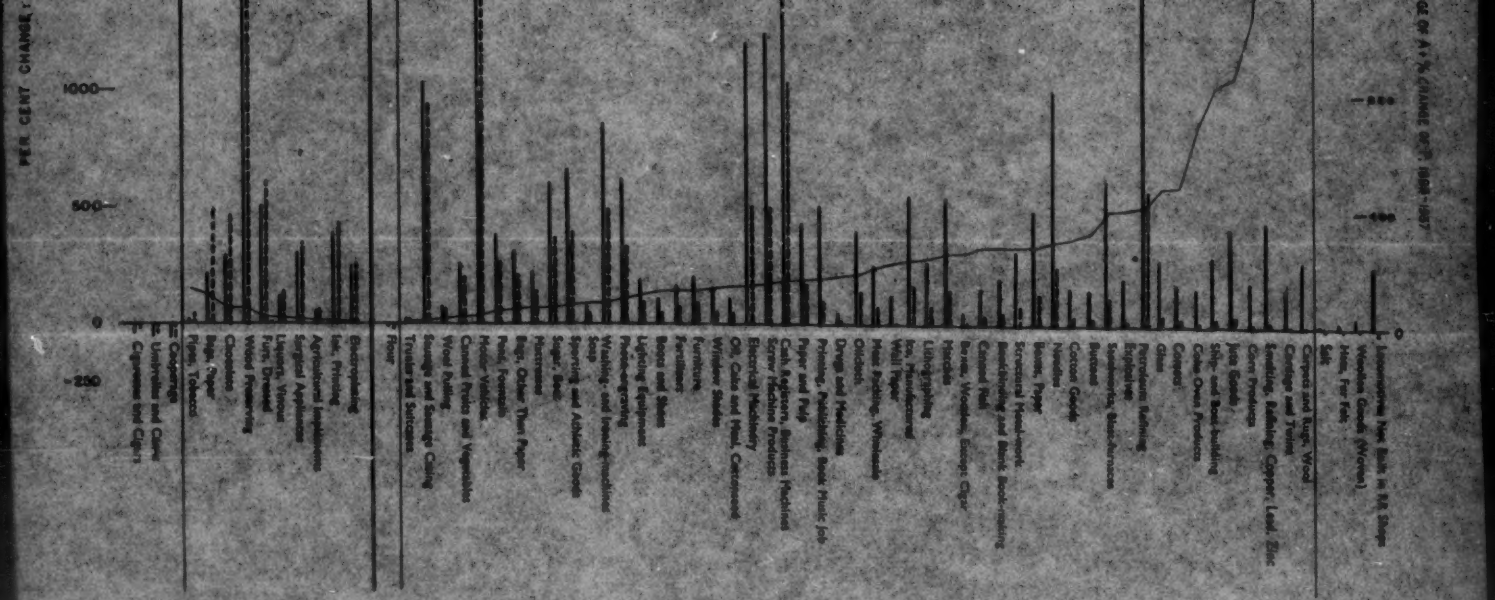


FIG. 25. Selected Manufacturing Industries. Per cent. Change in Administration and Production Personnel, by Increasing Size of Ratio: Change in %A + Change in %P, 1899–1937

FIG.
A/P P

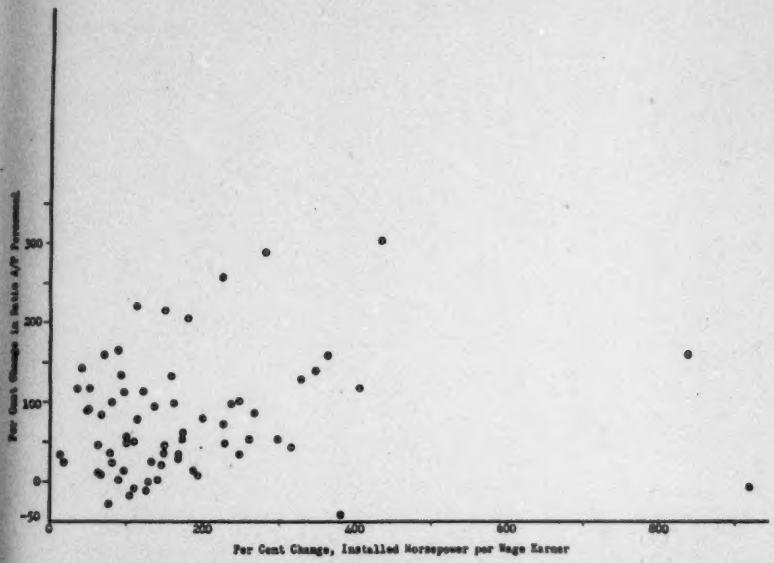


FIG. 24. Sampled Manufacturing Industries. Relation of Change in the Ratio of A/P Personnel, with Change in Installed Horsepower per Wage Earner, 1899–1929.

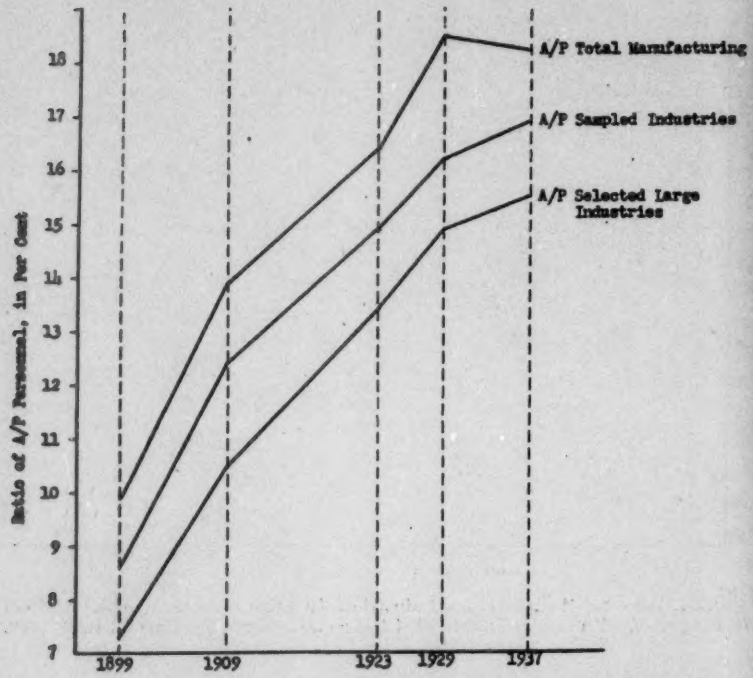


FIG. 26. Change in the Ratio of Administration: Production Personnel; Total Manufacturing, Sampled Industries, and Selected Large Industries, 1899–1937.

2

THE LOCATION PROBLEM IN THE BRITISH STEEL INDUSTRY

By S. J. LANGLEY

In May 1946 the British Iron and Steel Industry published its first five-year Development Plan. A second plan, which, it is clear, will involve important investment decisions, is known to be in preparation. As war-time deficiencies have been made good and a certain amount of reconstruction work has taken place, ambitious projects are probably being prepared. One of the most important issues to be faced is whether there should be an increase in the relative importance of the home ore-fields of the east midlands. An authoritative but perhaps somewhat exaggerated view has been put forward that in the central planning of the steel industry 'the choice of location must be the primary consideration. If it is wise the other things look after themselves; if it is unwise nothing can give low costs.'[1]

Opinion is sharply divided on this problem. One of the dominant themes of Mr. D. L. Burn's *Economic History of Steel-making* is that the industry has failed to take sufficient advantage of the existence of domestic ore supplies and to extend steel-making capacity on the ore-fields of Lincolnshire and Northamptonshire. That economic forces have not already led to greater expansion in these areas he attributes to inertia, political pressure, and the effects of the British Iron and Steel Federation's price policies in both the product and the factor markets. This view is widely held outside the industry and provided the background against which Professor Brian Tew reviewed the Development Plan in the *Economic Journal*.[2] Other commentators[3] have accepted this criticism, and the writer of this paper has himself subscribed[4] to what may be described as the orthodox academic view; *The Times* seldom discusses the steel industry without pointing to the ineptitude of present policies in this matter.[5]

The spokesmen of the industry have conceded that cost considerations do on balance show some advantage to steel based on home ore,[6] but have permitted their case that other considerations obscure this advantage to

[1] D. L. Burn, 'Recent Trends in the History of the Steel Industry', *Economic History Review*, vol. xvii, no. 2, 1947.

[2] September 1946.

[3] Ian Bowen, *Britain's Industrial Survival*, p. 122; Brady, *Crisis in Britain* (University of California Press), pp. 204 et seq.

[4] 'The Iron and Steel Act, 1949', *Economic Journal*, June 1950.

[5] See, for example, the leader headed 'War Against Waste', *The Times*, 11 Dec. 1950.

[6] *Report by the British Iron and Steel Federation*. Cmd. 6811, p. 12.

go by default.[1] A recent article in the British Iron and Steel Federation *Statistical Bulletin* on the location of the British steel industry,[2] however, presents an official view and provides at the same time a certain amount of hitherto unavailable cost data. There are strong arguments on both sides, and this paper attempts to clarify the issues involved; it concludes that the problem is less clear-cut than either side has admitted.

The characteristic feature of British steel-making is its geographical diversity. There are nine major producing areas, but substantial supplies of local ore are available in only three of them, and in the case of Cleveland the ores are becoming increasingly difficult and expensive to win and have to be supplemented by supplies from abroad. In spite of this, Britain's extensive ore-fields of the east midlands have attracted only four steel plants: three at Scunthorpe and the important basic Bessemer plant at Corby. These four integrated plants have a total capacity of about 2 million tons and in 1949 produced approximately 13 per cent. of the country's steel output at very low costs from local ores. As the raw materials used in the coastal and other midland areas have to be imported or hauled from the east midlands, this area appears to possess a very considerable natural advantage for steel-making. Mr. D. L. Burn has presented the figures in Table I to support his criticism of the existing locational pattern.

TABLE I[3]

Raw material costs of pig iron in shillings per ton

	1937	*1944*
Northamptonshire .	40–45	70–75
Lincolnshire . .	50–55	..
Coastal sites . .	60–70	100–105

The advantage of the home ore-fields is to some extent reduced by the fact that the imported ores are richer in iron content than the domestic supplies. Although the smaller quantities of ore and fuel required when foreign ores are smelted are reflected in the table, the reduced labour and capital charges that result from the greater output from blast-furnaces of a given size when imported ores are used do not seem to be. As the origin of the figures is not indicated, it is legitimate to suggest that they may be based on the up-to-date equipment of Scunthorpe and Corby on the one hand, and on the older blast-furnaces of the traditional sites on the other, with consequent further distortion in favour of the home fields.

[1] The Economic Director of the B.I.S.F., Mr. R. M. Shone, raised the matter in a paper read before the Royal Statistical Society, only to dismiss it as being too complex for a single paper. See *Journal of the Royal Statistical Society*, vol. cv, pt. 4, 1947.

[2] 'The Location of the British Steel Industry', B.I.S.F. *Monthly Statistical Bulletin*, Nov. 1950.

[3] Constructed from the figures quoted in Mr. Burn's article, 'Recent Trends in the History of the Steel Industry', loc. cit.

The information on present-day costs that has recently appeared suggests that the gap is now very much smaller. The British Iron and Steel Federation has calculated that pig-iron prime costs per ton in new plants based on home and imported ores differ by less than 20*s*., and that the difference in capital charges reduces the gap to 5*s*. These calculations, however, seem to be unduly favourable to the foreign ore plants. As imported ore of 55 per cent. Fe is included at 56*s*. per ton, it is difficult to see how the ore costs of a ton of iron could be less than 101*s*. 6*d*. Nevertheless, the Federation's calculations are based on a sum of 93*s*. total ore costs—a figure below the bare cost of the iron content if that exceeds 92 per cent. Any ore preparation it is proposed to carry out would not appear to add anything to the cost of the materials treated. Costs of domestic ores are also difficult to understand. On the basis of an average cost of 12*s*.[1] per ton for 30 per cent. Fe domestic ore it is not easy to see how the figure of 46*s*. total ore costs is achieved. As the Federation admits that costs would be appreciably less in a new plant ideally situated and observers have attributed very much lower costs to midland ores,[2] this calculation seems to imply an unsatisfactory location or very heavy ore preparation costs—costs which do not appear to be included in the foreign ore calculations.

As the Federation's figures are not internally consistent, the conclusion that the cost difference does not exceed 5*s*. per ton cannot be accepted. In default of more detailed cost information it is impossible to establish a completely satisfactory alternative cost difference, but a widening of the ore costs gap by, say, 15*s*. per ton,[3] giving a final difference of 20*s*., would not appear to be unreasonable. Although this figure is four times higher than the Federation's estimate, it is slightly less than 10 per cent. of the cost of pig iron,[4] and very much less significant than Mr. Burn has suggested. Indeed, in view of the steep rise that has taken place in the price of imported ores since 1937, the gap would now be very wide if Mr. Burn's figures had not seriously exaggerated the home field's advantage. The relevance to future locational decisions of even the amended Federation calculations is somewhat doubtful as the present relationship between the costs of home and imported ores is by no means immutable. Although both prices may continue to rise, it is reasonable to assume that domestic ores will become increasingly expensive as underground mining is extended;

[1] Average for the first half of 1950. B.I.S.F. *Statistical Bulletin*, Nov. 1950.

[2] The United Nations Report, *European Steel Trends in Setting of the World Market*, suggests 'about 7 shillings at some of the best open-cast mines with ore of 26% Fe': p. 49.

[3] This modification is, of course, to some extent arbitrary but the Federation's figures themselves would seem to suggest an adjustment of approximately 7*s*. 6*d*. more for foreign ore and the same amount less for home ore pig iron.

[4] And, of course, a very much smaller proportion of the cost of finished steel products.

on the other hand, an increase in coal exports and an improvement in port facilities would substantially reduce the freights on imported ores which themselves appear, since 1945, to have been imported at prices considerably above those ruling in the exporting countries.[1] On balance the gap is more likely to narrow further than to increase.

In spite of the home fields' cost advantage having been exaggerated by Mr. Burn, it clearly exists and has led to an increasing amount of the country's foundry pig iron being made there. The market for foundry iron is very diversified, but this has not prevented low costs from exerting their natural locational attraction. It thus appears that the failure of the home fields to attract more steel plants to places where pig iron can be produced most cheaply must be attributed to factors that are relevant to steel rather than iron making. At this stage of production the determining locational factors become more complex. The advantages of integration, and in particular of fuel economy, reinforce the attraction of areas in which pig iron can be produced most cheaply, but as they are reflected in the Federation's calculations they do not need further examination. The advantage of 20*s.* per ton at the pig-iron stage which the home fields seem to possess may be modified by the influence of at least four factors: scrap, transport, cost of capital investment, and social costs.

The examination of these factors does not provide a determinate solution but leads to the conclusion that it may be necessary to appeal to wider strategic and balance-of-payment considerations for further guidance.

(i) The scrap factor

Plentiful scrap supplies constitute a powerful locational attraction, but the issue is not straightforward. Scrap can be substituted for hot or cold pig iron within very wide limits, but when it replaces hot metal it imposes extra fuel costs; it can also be used, to a limited extent, as a raw material for pig iron. It arises in several different ways,[2] but approximately 40 per cent. of the industry's scrap consumption arose in 1949 within the steelworks themselves.[3] Most of this circulating scrap comes into existence at the various rolling and finishing stages of production and is consequently greatest where the degree of integration is highest. Thus in an integrated steelworks substantial scrap supplies come into existence spontaneously and exert no locational influence. Nevertheless, the traditional areas retain an advantage as, except in the case of south Wales, process scrap

[1] United Nations, op. cit., p. 65. The report also considers that 'it is likely that freight rates will fall in the near future as a consequence of the greater availability of freighters': p. 55.

[2] For further details see R. M. Shone, loc. cit.

[3] B.I.S.F. *Statistical Year Book for 1949.*

from local industry tends to be more readily available there than in other parts of the country. The coastal sites are also favourably situated for supplies of imported scrap, which in 1949 amounted to 20 per cent. of the industry's total consumption.

In the past the price of scrap has been very unstable, but since 1937 the B.I.S.F. has pursued a policy of stabilizing prices at a very low level. It has been argued that this policy of maintaining 'artificially' low prices by monopsonistic purchase may exert an influence to extend pig-iron production in the areas of plentiful scrap supply and obscure the real-cost advantage of the Bessemer and Duplex processes over the open-hearth method.[1] If this view is correct, the case for development on the home fields may be strengthened.

The costs of scrap are the costs of collection, transport, and preparation, but its market price has usually been determined by demand rather than supply considerations. Before the inception of the present policy its price closely followed the price of pig iron very much as economic theory would predict. This, however, led to considerable fluctuations, as pig-iron prices were themselves very unstable and appear to have fallen to prime costs during periods of excess capacity. The Federation's policy has brought this uncertainty to an end by giving long-term contracts to the scrap suppliers at prices which at the moment amount to only 40 per cent. of the price of pig iron. Before the validity of Mr. Burn's view that locational decisions may be distorted by this arrangement is considered, it should be noted that the industry has instituted a pooling scheme which has achieved a partial factor-price equalization. 'To mitigate the effects of the steep rise in the cost of pig iron a self-balancing payment and receipt is arranged as between firms, based on the proportions of pig iron and scrap used in making ingots. This arrangement still leaves pig iron costly in relation to scrap, but it does go some way towards spreading over the industry the extreme burden of the rise in pig-iron costs.'[2] This institutional device does not, of course, affect the central issue, although it may well prevent Mr. Burn's distortion from arising if there is, in fact, a danger of its doing so. It can also, perhaps, be regarded as a recognition of the force of his criticism of the Federation's price policy in the scrap market.[3]

The important question is what effect ought the availability of local scrap supplies to exert on investment decisions when its price is prevented from rising to the competitive level? If investment expenditure in the steel industry were determined by normal economic criteria, monopsonistic purchase would clearly lead to excessive investment, but as the price

[1] D. L. Burn, loc. cit., p. 99.

[2] B.I.S.F. *Statistical Bulletin*, June 1948, p. 3.

[3] The scrap/pig-iron equalization fund was, however, established before Mr. Burn's criticism was published.

mechanism is replaced in this matter by *ad hoc* physical planning and strategic considerations, this difficulty does not arise. The proponents of the academic view claim that the Federation's policy obscures the real-cost advantage of certain areas and processes. This view seems to rest on a confusion which reduces much of its force. In the case of existing plants there is clearly an advantage in being situated near to the supply of a factor with a very low cost: an advantage that can be measured by the cost of transporting the factor to its next nearest market. Similarly the advantage possessed by a process that can use scrap as a raw material is far from artificial. The recent building of a number of open-hearth furnaces at the Corby basic Bessemer plant is a clear recognition of this: in spite of the fact that basic Bessemer steel can be made very cheaply at Corby, the method of production which is technically less efficient in the case of east midland ores has been introduced to make use of the considerable supplies of circulating scrap that arise in the plant and cannot be used in the Bessemer process. It is thus somewhat unrealistic to speak of the real cost advantage of the Bessemer over the open-hearth method of production when it cannot use[1] a virtually costless raw material. It suggests, in fact, a confusion of economic and technical efficiency.

When a decision to build a new plant is involved, the problem takes a different form. As the supply of scrap is highly inelastic, an increased demand for it results in less being used by other plants. Thus, although a new plant may use scrap in considerable quantities, the extra demands for material will be, from the point of view of the industry, predominantly demands for pig iron.[2] Whether a supply of local scrap affects the situation depends on whether it is being fully used in the district or exported to other parts of the country. If local plants can make economical use of existing scrap, it exerts no locational influence whatsoever; to the extent that the scrap is exported to other areas, as it is from Scotland and the midlands, there is a cost advantage in those areas at least to the extent of the transport charges involved.

The proponents of the academic view are substantially correct when they say that the Federation's scrap policy introduces a distortion into the structure of steel costs, although the price equalization scheme tends to rectify this in practice. It hides the fact that new capacity would, in fact, use pig iron and not scrap as a raw material wherever it was situated. On the other hand, the areas with surplus scrap supplies clearly retain a cost advantage to the extent of the cost of transporting them elsewhere. Thus Mr. Burn is not quite correct when he says that 'pig-iron costs are marginal

[1] Small quantities of scrap can in fact be used in the Bessemer converter, but on a very limited scale.

[2] There will, of course, be an addition to scrap supplies from the output of the new plant itself which may eventually amount to as much as 50 per cent. of the new output.

in an expanding steel industry and that the lowest national costs always result where marginal pig-iron costs are lowest'.[1] Providing pig-iron costs in areas with excessive scrap supplies do not exceed the pig-iron costs elsewhere by more than the cost of transporting the surplus scrap to its nearest market, extension of pig-iron capacity there could be justified.

(ii) The transport factor

Historically the weight-losing propensities of both iron and coal have exerted a very strong influence on the industry's location; whether their importance is as great today is less clear. During the last few decades there has been a noticeable reduction in the cost of transport facilities, and Mr. S. R. Dennison[2] has written, 'it seems true that over a large part of the field, transport costs of materials now have but little significance for location. Almost any situation would involve about the same level of costs as any other.' Mr. Dennison made his generalization in regard to the newer expanding industries, but it is very unlikely that the tendency he has noticed has no relevance to the steel industry. However, it is in the case of subsidiary materials only that it can bear on the present problem, because the conflicting views assume optimum locations for home and foreign ore plants; minimum costs of iron-ore transport are already reflected in the Federation's pig-iron calculations. Thus, apart from the comparatively small quantities of domestic ore that are sent from the midlands to other areas because of their chemical qualities, the cost of transporting ore does not influence the problem further; the important consideration is the relative costs of transporting finished steel products from traditional and east midland sites to their markets. The older steel plants are in or near to considerable steel-consuming areas and are in some cases very well placed for export orders, but on the other hand the industrial importance of the midlands and the London area is increasing; the Federation estimates that between them they account for 34 per cent. of the country's steel consumption. The ore-fields of the east midlands may be less remote from substantial markets than is sometimes supposed.

Previous discussions of the transport factor do not appear to have made allowance for the railway companies' method of charging. The inherited practice of British Railways to charge what the traffic will bear divorces freights from the marginal costs which should play their part in the determination of locational policy. The schedule of railway charges with which the steel firms must concern themselves is of little use to the economist searching for the criteria on which to base locational decisions in the public interest. The steel industry itself claims that the freights on iron ore are

[1] D. L. Burn, loc. cit., p. 99.

[2] *The Location of Industry and the Depressed Areas*, p. 57.

excessive in view of the low cost of handling full and regular train loads. *A priori* considerations suggest that the freights paid on the more expensive steel products exceed marginal costs, particularly for long hauls; to the extent that this is so, the advantage of proximity to markets is illusory.[1]

In spite of the fact that the iron and steel industry incurs very considerable transport costs, estimated[2] by the Federation to have been £12,600,000 in 1936 (14 per cent. of total freight receipts), it is not clear that great transport economies could be achieved by a search for optimum locations. Delivery charges seldom reach 10 per cent. of the total costs of even the cheaper steel products, and are not often more than 2 per cent. of the costs of the more expensive products.[3] The cost of transporting domestic ore is undoubtedly very much higher, although Mr. Dennison's figures[4] seem excessive and would appear to reflect the method of charging rather than the costs involved. In any case, additional capacity in the traditional areas is unlikely to involve the use of large quantities of home ores in normal conditions. Substantial quantities of domestic ore are carried to other parts of the country, but at least half of this (1,800,000 tons in 1949) is sent from the southern to the northern part of the home fields to balance the excessive amount of lime in the Lincolnshire deposits, and an extension of steel-making capacity in Scunthorpe would increase this particular traffic. Although a little more than a million tons of domestic ores were hauled to south Wales and the industrial midlands in 1949, the real decision involved in deciding whether a new plant is to be built in a traditional area or on the home fields is whether imported or domestic ores shall be used. This would not be true in the case of Lancashire, Sheffield, or the industrial midlands, but, in spite of plentiful supplies of local scrap and coal, large-scale expansions to crude-steel capacity are unlikely to be proposed there. The real choice seems to be between Scotland, south Wales, and the north-east coast on the one hand,[5] and the home fields on the other.

The costs of transporting coal cannot be ignored, but improvements in

[1] The recent decision of the British Transport Commission to modify the existing charges procedure by paying more regard to loading factors and less to the value of the product, indicating a belated recognition of academic criticism, may tend to remove this distortion.

[2] *Report of the Import Duties Advisory Committee on the Present Position and Future Development of the Iron and Steel Industry.* Cmd. 5507, p. 61.

[3] Dennison, op. cit., p. 65. This refers to pre-war conditions, but the situation may not be very different today. The United Steel Companies, for example, reveal in their *Reviews of Progress* that delivery charges amounted to 4·06 per cent. and 4·02 per cent. of total incomes from sales during 1949 and 1950.

[4] 'The cost of native phosphoric iron ore would be doubled by a haul of 35 miles and more than quadrupled by one of 120 miles': Dennison, op. cit., p. 46.

[5] Excluding what Professor Brian Tew (loc. cit.) has called pseudo-coastal sites many miles from deep water.

fuel technology are reducing their importance as a locational factor[1] in the steel industry. In addition the geographical diversity of the coalfields prevents transport charges from becoming excessive in any of the steel areas. The plants situated on the lower parts of the Jurassic Belt obtain their coal supplies from the Derby–Nottingham field and incur somewhat higher transport costs than most other areas. The haul involved is not, however, a long one, and the coal is mined at costs below the national average. As the coal industry follows the iron and steel industry's practice of subsidizing high cost production, some of this natural advantage has, as Mr. Burn has pointed out, tended to reduce steel-making costs elsewhere.

(iii) The costs-of-capital-investment factor

Critics of the steel industry have insisted that the steel-makers have failed to maintain the efficiency of their industry during the last 50 years. Piecemeal patching of old and badly sited plant has been preferred to the bolder policy of scrapping and building that has characterized the development of the American steel industry. While it is important to appreciate the difficulties of unstable demand with its need for quick expansion of output and its depressing effects on expectations that led to this policy, it seems fair to say that the underlying economic conditions would have justified somewhat bolder planning, at least since 1932 when the industry was granted protection. Nevertheless, it is not clear that the case for building integrated plants in the east midlands is equally strong today.

The demand for steel is still buoyant, and output has already reached a rate of 17,400,000 tons a year[2]—the figure that the Secretariat of the United Nations E.C.E. Steel Division estimates to be the United Kingdom's target for 1953. Exactly how much steel-making capacity should be planned it is not easy to determine, but substantial increases do not seem to be likely, and in the light of the conclusions of the United Nations Report would indeed probably be very unwise. On the liberal assumption that capacity will be increased to 20 million tons during the currency of the second Development Plan it is not clear that the building of new green-field plants could now be justified. To the extent that there are unexploited opportunities for further economies of integration in existing plants there may be a strong case for piecemeal additions and modernizations. Although such extensions may appear to bear a close affinity to the industry's old policy of 'patching', they may well achieve the best allocation of scarce resources under the changed conditions of the post-war world.

[1] To the extent that the coking qualities of coal vary, however, south Wales and Durham still retain an advantage.

[2] Annual rate during Nov. 1950. It may not, of course, be possible to maintain this rate of output.

However inefficient from a purely technical point of view a piece of productive equipment may be, it retains a useful economic life if it can produce output at prime costs which are below the total costs with more up-to-date replacements. Existing plant need not impose capital charges on current and future output. Bygones are for ever bygones, and apart from the interest on the scrap value of the old machinery and any maintenance charges it may involve, no further costs are incurred when it is used. The use of new equipment, on the other hand, often imposes very high capital charges on output if it is to justify itself. As the capital cost of new capacity seems to be rather more than 5½ times[1] as high as it was in 1935, it would not appear unreasonable to suggest that there is not a great deal of equipment now in use which should be scrapped, and that there must be many cases in which output could be increased by the employment of comparatively small sums of capital in existing plants. Policies which should, perhaps, have been carried out in the twenties and early thirties may not be appropriate today. The Federation recognized this difficulty in its 1946 report and seemed conscious of what the industry's critics had been saying.

'In the case of some of the lower-cost plant displaced, the gain may be very small or, in particular cases, there may be no immediate saving. This, however, is to some extent inevitable in a major reconstruction plan. The big new units it is necessary to build involve displacing a mixed collection of plant, some of which is still moderately good. Unless this issue is faced as it has been, the reconstruction is a patchwork job and does not achieve the best long-term result.'[2]

As present building costs seem to be about twice as high as they were thought to be when the report was written, it is doubtful whether this view would be put forward quite so strongly today. Indeed, the industry has not carried out its own good intentions in this matter. The Margam plant of the Steel Company of Wales which will replace a considerable quantity of out-of-date equipment is still going forward, but at much greater cost than was envisaged; little of the equipment the plan proposed to replace has been withdrawn from use, and in spite of the heavy post-war demand for steel that part of it designed to build a completely new integrated plant on Northamptonshire ores seems to have been dropped[3] in favour of expansion at Corby.

Professor Brian Tew has written, 'if resources available for investment

[1] The cost of a ton of billet capacity is said in the Federation report to have been about £8. 12*s.* per ton in 1935 and to have risen to £23. 10*s.* by 1946. As the pig-iron capital charges quoted in the Federation's location article are twice as high as the 1946 level (25*s.* to 51*s.*), it seems reasonable to conclude that present costs have doubled for all stages of production, and that the cost of one ton of billet capacity amounts to approximately £48 today. The United Nations Report refers to estimates of $200–400 for a ton of integrated crude steel capacity.

[2] *Report by the British Iron and Steel Federation*, p. 31.

[3] The shortage of houses and labour was probably a contributory factor.

are sufficiently limited, there is almost no case when "patching" would not be more advantageous to the community than building from scratch on a new site'.[1] He was, however, of the opinion that the magnitude of the plan itself implied that resources were not short enough in 1946 to justify a return to the old policy and that more new building in the east midlands should have been planned. It is here contended that the present scarcity of capital dictates a very careful use of capital resources. If total steel requirements in the foreseeable future exceed the output that can be achieved by modernizing existing capacity, clearly new plants will have to be built; if they do not, the major proportion of the industry's development must take place where 87 per cent. of the crude-steel capacity is situated—in the traditional areas. This manifestation of the economic problem seems to reduce the attractiveness of the home ore-fields for further development.

If this conclusion is resisted, as it may be, on the grounds that the country should take a longer view on considerations of strategy and ultimate efficiency in a vitally important industry, it should be recognized that a rise in steel prices or assistance from the proceeds of general taxation is being called for. The costs of pushing technical efficiency beyond the limits imposed by economic considerations must in the end be met.

(iv) The social-costs factor

During the nineteenth century the metal-using trades were drawn to the centres of iron and steel production and extensive and highly specialized markets now surround the older steel-making sites. Much of this advantage is difficult to measure and consists of goodwill, personal contacts, and local knowledge. Factors more normally thought of under the heading of external economies in the shape of specialized service industries, transport facilities, and supplies of local labour are particularly strong in the case of the iron and steel industry. Such economies always favour established locations. Their absence gives rise to costs, some of which fall on the plants in the newer areas, but the greater part of which seem to fall on society. The need for social capital in hitherto rural areas brings about a divergence between private and social costs, and it is on the basis of the former only that much of the case for large-scale development in the east midlands has been based. In an economy where existing social capital is seriously inadequate this divergence might not appear, as social capital formation would in any case be necessary. In Great Britain, however, there are areas where social capital is comparatively plentiful and Development Area legislation is encouraging industrial migration to them with little regard for locational advantage. Locational decisions in the steel industry

[1] Loc. cit.

cannot be taken without regard to economic policies being pursued in other sections of the economy, and these would appear to favour development in at least those steel-making regions that have been scheduled as Development Areas.

Two further factors call for consideration. As new towns are in any case being built, there is little justification for attributing concealed social costs to the steel industry when it builds plants in rural areas. To the extent that the east midlands have town-planning potentialities this divergence does not arise. On the other hand, the large-scale extraction of ironstone from the midland fields has, with the development of mechanical excavation, led to the devastation of large areas of agricultural land. The implementation of the Walters report[1] may well impose substantial costs on the taxpayer for the restoration of present devastation and higher costs on the ironstone industry itself in the future. The cost of domestic ore may be very much higher in the future as a result of this factor and of the need, already noted, to extend underground ore-mining operations.

Conclusion

The analysis in this paper leads to the conclusion that the case for expanding steel production on the home fields may have been exaggerated by Mr. Burn and his followers. There is a clear cost advantage at the pig-iron stage on the basis of existing price relationships, but these appear to be likely to move in favour of the traditional sites in the future. The advantages for further development possessed by the traditional sites merely by being situated in established steel-making areas are considerable and appear to be reinforced by the high costs of new plant. Transport costs may be less important than has often been assumed, and providing that the new plants do not call for long hauls of domestic ores or pig iron, one site is unlikely to show any very great advantage over another. Divergences of social and private costs seem to arise but, apart from the problem of the restoration of devastated agricultural land, they may not in the end be very important. The major question appears to be the problem whether Great Britain should, on strategic and balance-of-payment considerations, increase her dependence on foreign ores. It is on the nature of the answer to this question that the future locational pattern of the British Steel Industry must depend.

[1] *Report on the Restoration Problem in the Ironstone Industry in the Midlands.* Cmd. 6906, 1946.

THE UNIVERSITY OF SHEFFIELD

PLANNED INVESTMENT IN THE COAL INDUSTRY[1]

By A. BEACHAM

THE *Plan for Coal* is the National Coal Board's long-term capital investment programme published in October 1950 and covering the period up to 1965. The object of this paper is to summarize the plan, to show how it was formulated, and to see how far it can be justified by reference to the sort of rules which economists apply in cases of this kind.

I

In the first place it is necessary to call attention to certain features of the coal industry which to some extent mark it off from the general run of manufacturing industry. It is highly dangerous to develop arguments about the economics of coal unless these points are fully borne in mind. A full treatment of them is not possible here, but their significance will be readily appreciated and will become more obvious later.

(*a*) Coal-mining is concerned with the extraction of a wasting asset. The availability of a sufficient quantity of workable reserves is a vital consideration affecting the future planning of the industry. The geologist must speak before the mining engineer or the economist can venture an opinion. This also suggests the need for careful conservation of our limited resources, even if the systematic and orderly exploitation of the coal conflicts to some extent with short-run profit-and-loss considerations. The importance of this is further underlined when the working of coal is entrusted to a public corporation enjoined to have regard to the national interest in all respects. It also follows that the working life (and therefore the value) of capital assets, fixed in use, is more than ordinarily delimited, and this must also affect the framing of capital development programmes. In particular it will mean that the balance of advantage between the continued working of existing mines and the sinking of new ones will be extremely difficult to determine. Once again short-term considerations may conflict with the long-term. The best prospect of cheap coal in this country in the immediate future will derive from aiming at an output little above the present level and obtaining it from existing mines with limited technical reorganization. This might also be the best means of conserving our limited coal reserves. But in (say) 15 years time we might be faced with a coal shortage and steeply rising costs. Nor could this situation be easily or

[1] This paper was originally prepared as a lecture for delivery to the South Western Society of Mining Engineers.

quickly rectified since new deep pits take a long time to sink and bring into full production. Their very high cost must be borne in the present, with little to show on the revenue side, if the future is to be safeguarded.

(*b*) The extreme variability of working conditions is another marked characteristic of the industry. Differences in the quality of coal are in no way related, except by coincidence, to the cost of mining it, and coals of roughly equivalent quality may be mined at very different costs in different places.[1] The same pit may produce a wide variety of coals from different seams and the attribution of costs to particular qualities of coal is necessarily somewhat arbitrary. Moreover, the value of the coal to consumers will depend not only on its chemical composition but also on its size, cleanliness, &c. Under private enterprise (at any rate prior to 1930) the coal-owner could take the intricate and elaborate price structure produced by the interaction of market forces very much for granted and base his capital expenditure plans upon it. He could be certain that his actions would not sensibly affect the balance of prices. Nowadays the price structure is to a large extent what the N.C.B. chooses to make it, but it cannot frame a capital expenditure programme on the assumption that it will remain unmodified by the effect of the programme itself or the reactions of consumers to the imposed price structure. Estimates of relative prices and relative costs which must form basic data for the framing of capital investment programmes must therefore be extremely tentative.

(*c*) Next we must note the inelasticity of demand for coal. This considerably simplifies planning because demand can be more or less taken as given without too much reference to cost and price. Also, it makes it easier to justify capital expenditure in meeting the demand and, which is really saying the same thing, gives a margin of error which can be corrected by raising the price. That is to say, mistakes in planning will not necessarily show themselves in the form of future losses. But this fact of inelasticity of demand should not be pressed too far. A high price for coal will undoubtedly depress demand in the long run by accelerating the search for efficient substitutes and by promoting economy of use. Moreover, it is only the demand for coal in the home market which is inelastic. In normal times the foreign demand is likely to be very sensitive to price considerations—an important point in considering the present capital development programme, as we shall see later. It also needs to be borne in mind that, except perhaps in periods of acute shortage, the demand for

[1] The word 'costs' does not mean much without further qualification and costs will of course vary with the scale of output. The only point intended here is that the existence of high-quality coal is a fact of nature and does not reflect extra effort involved in its production. It may or may not be possible to expand its production up to the point at which average or marginal costs equal the value set on it by consumers.

particular grades and qualities of coal may respond sharply to relative price movements because of the possibilities of substituting one kind of coal for another.

(*d*) Wage costs per ton in the coal industry are about 70 per cent. of total costs. In planning the future of the industry therefore the assumptions made about the future of wage rates and productivity are unusually important.

II

We may now summarize briefly the content of the plan—neglecting for the moment the procedures by which these results were obtained. Between 1950 and 1965, £635 million is to be spent on capital development, of which £115 million is allocated to ancillary plant and £36 million to contingencies, i.e. about £484 million[1] will be spent directly on colliery development. The output planned for 1965 is 240 million tons as against a deep-mined output in 1949 of 202·7 million tons. Seventy per cent. of the 1965 output will be produced by 250 pits at present working but scheduled for reconstruction; 10 per cent. by 22 new pits and 53 new drifts; and 20 per cent. by 250 pits at present working and not to be reconstructed. Some 350–400 pits at present working will be closed.

The 1965 output will be produced by 618,000 men as against 698,000 in 1949, i.e. output per man-year will rise from about 300 to 390 tons per annum. On the assumptions of the plan this will result in a saving of about 7*s*. per ton[2] at 1949 prices. The increased output will come mainly from Scotland, other than the central coalfield (+ 8·4 m.t.[3]), East Durham (+ 3·0 m.t.), Yorkshire (+ 8·4 m.t.), East Midlands (+ 8·4 m.t.), and South Wales (+ 9·2 m.t.). Output is planned to fall in Central Scotland (−1·6 m.t.), West Durham (−2·4 m.t.), Lancashire (−0·3 m.t.), and in some of the smaller coalfields. By 1965 it is reckoned that the expanding coalfields of Yorkshire, Nottinghamshire, Derbyshire, Leicestershire, Warwickshire, and Kent will increase their share of the national output from 43 to 44 per cent.; Scotland will increase its share from 12 to 13 per cent.; and South Wales will increase its share from 11 to 13 per cent. The share of the northern coalfields will decline from 19 to 18 per cent. and the other coalfields' share will decline from 15 to 12 per cent. Of the projected expenditure of £484 million on colliery developments South Wales will take £102·7 million, East Midlands £79 million, Yorkshire £72 million, Scotland £64·3 million, and Durham £54 million. Altogether it is planned

[1] Of which about £350 million will be needed to maintain the present output and the balance to raise output to the 1965 level.

[2] It is emphasized that a much greater cost reduction would have been possible if the plan had been confined to the maintenance of the present output.

[3] m.t. = million tons.

to sink 22 new deep pits, of which 9 are planned for Scotland, 7 for South Wales, 2 for East Midlands, and 2 for Yorkshire.

III

How were these results obtained? This part of the *Plan for Coal* has considerable fascination for economists who have been actively debating in recent years the theory and practice of business behaviour. So far as the nationalized industries are concerned it would appear that we shall be much better informed in the future than we have been in the past. It is surprising in a business document of this kind to find references to schedules of marginal cost, and what student of elementary economics would fail to be heartened by the following? 'At the outset the Board were faced with a series of circular arguments. Thus the future demand for coal depends on price, . . . price turns on costs of production and delivery, costs on how much coal has to be produced, of what kinds and where, which in turn depends on the demand.'[1]

This circle was broken by the use of certain initial assumptions. When tentative answers were arrived at by this means the assumptions were checked in the light of them and the results modified accordingly. Then certain extraneous (i.e. non-economic) considerations were brought into the argument and the plan was checked through again. The most important of these initial assumptions were: (1) That the demand for coal, and particularly home demand, could be taken as given. After carefully reviewing the available evidence, inland demand was assessed at 205–15 m.t. per annum and this was broken down so far as possible into different categories of coal and consumption regions. Export demand (including bunkers) was estimated at 25–35 m.t. per annum, but this is readily admitted, for obvious reasons, to be little more than a guess. The two estimates were then combined and it was assumed that the Board would require to meet a total demand of about 240 m.t. in 1965. (2) It was assumed initially that capital would be forthcoming in any amounts required and that all necessary man-power would be available in the places required. (3) All estimates were based on mid-1949 values. (4) It was assumed that wages will rise only in so far as they reflect increased productivity, that relative wage rates for different classes of work will remain the same, and that local anomalies in piece rates will disappear.

On this basis for each pit (and, by aggregation, for each area) ladders of cost or 'schedules of marginal cost'[2] were worked out. That is to say, for

[1] *Plan for Coal*, p. 33.

[2] As the next sentence makes clear, they are really schedules of average cost from which, of course, marginal costs can be derived. This point is taken up below.

each hypothetical level of average cost per ton the output of each main category of coal was estimated—on the assumption that any possibilities of technical reorganization were carried out.[1] Apart from the assumptions previously noted, it was assumed that a five-day week would be worked. Cautious allowance was made for advances in technique and an adjustment made for unforeseen mining risks.

These ladders of cost were then matched against the estimates of demand—and provisional answers obtained to the important questions: which pits could most economically meet the demand, how much would need to be spent on them, how many men would be required, &c.? These results were then carefully scrutinized. A sharp fall in output seemed to be predicted in West Durham and Cumberland, and in view of the social consequences of this the plan was modified to their advantage. Then transport costs had to be taken into account. Scotland, East Midlands, and Yorkshire showed the greatest possibilities of output expansion at low cost, but this in itself neither justified nor made possible such expansion. Thus, for example, the Midlands and Yorkshire coalfields could produce much of the coal required by Lancashire more cheaply than Lancashire could provide it, but transport costs limited the advantage and in any case the physical possibilities of rail transport were limited.[2] Thus the planned output of Lancashire had to be revised upwards and that of the other coalfields reduced. The most serious difficulty, however, must have been on account of the high cost of various special coals, e.g. Durham coking coal or South Wales anthracite. Where these could only be produced at exorbitant cost some account obviously had to be taken of the possibilities of substitution by consumers. It seems to have been decided that to some extent the cost of working the high-quality coking coal of West Durham was not justified in view of the much lower cost of producing coking coals of lower quality elsewhere. This sort of adjustment within the main categories of coals must have been extraordinarily difficult to make and we are not told how far it was taken. It did not apparently affect the initial planned output for South Wales anthracite—perhaps because the possibilities of substitution were reckoned to be less. Also, West Durham seems to have regained some of its advantage on non-economic grounds of avoiding grave social repercussions.[3]

The Board aims at pricing each class of coal, in each consuming region, at the cost[4] of producing it plus costs of transport. This would enable the Board to pay its way and accounts for the fact that no calculation of

[1] Apparently a provisional programme of development was drawn up for each pit.

[2] It is not clear whether the Railway Executive was consulted about this.

[3] Some of the points raised in this paragraph are further dealt with in section IV below.

[4] Presumably average cost is meant.

proceeds is worked into the plan. In fact, the Board will meet demands for coal at the lowest cost (subject to exceptions already noted) and has no doubt of its ability to recover these costs from consumers. On an over-all view it may be right in this assumption. But there is no reason for assuming that these average cost-prices can be made, by output variation, to reflect exactly the preferences of consumers for different kinds of coal and the reactions of consumers may force considerable changes in the plan. As we have noted, some adjustments were made to meet this sort of case, but there must have been a large element of guess-work involved.

On one important point the plan is not clear. I have assumed that demand is matched against the ladders of cost so that in ideal equilibrium the average cost of producing coal of a particular quality is everywhere equal. This interpretation has been taken because it seems to be assumed that collieries will not be expected to make losses or profits (prices being based on average costs), though it is realized that in practice they may occur because the market situation will be constantly changing and that an ideal adjustment to it will not be possible (*vide* paragraphs 159–60).[1] But this interpretation directly conflicts with the sense of paragraph 151, where it is stated: 'For deciding between competing coalfields average costs would not have been a satisfactory guide. It is not enough that a coalfield has low average costs. When it is expanded beyond a certain point the cost of producing additional coal tends to rise as deeper and less favourable seams have to be worked .... Hence the significance of marginal costs and the reason why they were adopted by the Board in deciding between alternative sources of supply.' The first interpretation is clearly not consistent with the second. An additional tonnage may be obtained at lower marginal cost from *A* than from *B*, but the average cost of coal from *A* may be above that of *B*. If marginal cost is to be the criterion for output expansion, and most economists would say that it should be, then the normal situation will be that, at whatever level prices are fixed most pits will be making profits or losses. Yet the Coal Board sticks to its assertion that the price of coal shall be equal to the (average?) cost of producing it.[2] It is possible that by this is meant the over-all average cost, i.e. the total cost of the entire output of that quality of coal divided by the tonnage.[3] Even if this is so it is difficult to see how pit losses and profits can then bear the significance which the Board seeks to attribute to them.[4]

[1] See also N.C.B. Report for 1947, p. 119.

[2] The context suggests that average costs of supplies from a particular pit or area is meant.

[3] An extremely difficult calculation to make unless very broad categories of coal were taken. For obvious reasons coal cannot be priced uniformly in broad categories.

[4] See N.C.B. Report for 1947, p. 119.

IV

It is of course quite impossible for the economist, or anyone else, to say how far this programme of new investment is justified. In order to arrive at a positive opinion we would require much purely technical information, knowledge of the returns to alternative lines of capital expenditure, detailed information of consumer preferences, and an accurate picture of the future in all respects. In a general way, however, it might be said that, if production can be expanded at a cost which consumers will willingly meet rather than go without extra coal, the new investment programme is justified.[1] The validity of this 'rule' depends on various assumptions which are never realized in practice and which it is impossible to test empirically. We shall need to qualify it later on, but it is perhaps a good enough starting-point.[2]

In a competitive private enterprise economy such a situation would tend to show itself in the form of abnormal profits which would disappear as existing producers expanded production or as new firms came into production. In theory, new investment would feel its way along this and other possible lines of expenditure as the most urgent wants of consumers were satisfied.

This line of approach is not very helpful to the N.C.B., which has a monopoly of its own line of production. It can hardly exploit consumers to the maximum extent possible and justify further capital expenditure by reason of the profits realized. Also, partly because of the nature of the industry and partly for other reasons, long-term planning is necessary and so it cannot slowly feel its way.

If we look at the plan as a whole, there can be little doubt that so far as meeting the internal demand for coal is concerned, very considerable capital expenditures can be justified. There is still a very considerable margin between the inland price of coal and the price at which foreign coal could be delivered here. Fuel of some kind is indispensable to our economy

[1] i.e. the investment is justified if the coal can be sold at a price which will enable interest and amortization of the capital to be met. The reader is reminded that the coal industry is required by statute to pay its way. For a more theoretical discussion of investment policy for nationalized industry see M. F. Scott, *Review of Economic Studies*, 1949–50, No. 44.

[2] We are not here considering the case of changing methods of working existing pits, though we cannot properly distinguish between investment required to improve efficiency and investment required to maintain and expand output. If all existing outputs were being mined by the 'best' methods, then the whole of this programme could be included in this second category. We cannot believe, however, that this is the case, i.e. some of the planned expenditure would be required on efficiency grounds to replace existing assets which are not worn out. The justification for such replacement will depend very largely upon whether the full cost of working with the new methods is less than the direct cost with existing equipment. As regards non-replacement capital expenditure it is assumed that the plan is based on the best technical information available, and that alternative methods of working have been properly costed.

and economic substitutes are not available in any quantity. It has been estimated that £350 million of the planned capital expenditure is required to maintain output, and this output barely covers inland requirements. Subject to the assumption made in the last footnote and certain qualifications made below, we may say that this expenditure of £350 million is fully justified especially since, if the plan were confined to this, a much greater reduction of costs would be made possible.

The balance required to expand output is more dubious. *In the aggregate* it is this extra output which will (approximately) provide our future export margin. This marginal amount can only be produced at heavy additional cost[1] for a market where demand is likely to be moderately elastic. We cannot be certain that foreign consumers will meet these costs rather than take coal from other countries. If they will not, then the extra £170 million of capital expenditure to expand output cannot be justified. There is no answer to this conundrum, and we can only say that under normal conditions it is reasonable to doubt our ability to export 30 m.t. of coal at an economic price. The fact that the Board may still make a profit (e.g. by making the home consumer pay a concealed export subsidy) will not in itself be evidence that the plan has justified itself. The doubt attaching to this £170 million expenditure shows up an important weakness of the plan. In starting from firm assumptions about future demand the Board has been forced to regard as equally firm its estimates of home *and export* demand.

Let us now take another look at the £350 million for which we were able to make initially a much stronger case. We have already assumed that it will be spent in the best way,[2] and we need further to assume that there will be no calls of greater urgency on these capital resources for use elsewhere. These assumptions are difficult to check and certainly cannot be checked here. But we also need to be satisfied that it will be spent in the right places and in producing the right qualities of coal. How has the N.C.B. estimated the point at which consumers of high-quality Durham gas coal will accept as a substitute the inferior but cheaper gas coal from the Midlands? An answer to this question must be found before the proper allocation of capital expenditure between the two coalfields can be determined. The Board is in a better position to answer this question than any private person and is therefore more likely to be right, but it is impossible not to be surprised by the extent to which new capital expenditure

[1] The attribution of this marginal output specifically to exports may be regarded as a doubtful procedure, but the argument is not much affected thereby. Export demand is generally strongest for those high-quality special coals which the plan has shown can only be produced at very high cost.

[2] i.e. as between reorganizing existing pits and sinking new ones and as between different methods of working coal.

is to be allocated to the working of high-cost special coals. This applies, for example, to the anthracite area of South Wales, though this is admittedly covered by a proviso that there must be an improvement in industrial relations in the area. The projected output of 6 m.t. is nearly equal to the previous highest recorded output and is more than double the present output. The cost of this coal will undoubtedly be very great and it may be doubted whether consumers will place a sufficiently high premium on it especially when we consider that most of it will be exported.[1] The result is that a surprisingly large proportion of the proposed capital expenditure is allocated to South Wales and a considerable expansion of output is planned. The rate of expansion of the low-cost Midland coalfields, on the other hand, will be appreciably slowed down if the plan is adhered to.

The same sort of considerations arise in respect of proximity to markets, but here the Board is on firmer ground since railway freight rates and the physical capacity of the railway system can be closely estimated. It is interesting to note that although this factor led to some adjustment in favour of high-cost areas such as Lancashire, the balance of advantage remained on the whole with the Midland coalfields. Lancashire's output is planned to decline slightly and her share of the projected capital expenditure is comparatively modest.

We can only briefly review the assumptions on which the plan is based in the light of the results it gives. Capital requirements do not appear to be excessive for a 15-year programme having regard to the scale and importance of the industry. Recent man-power trends suggest that fewer than 618,000 men will be available in 1965, and since the rate of shrinkage varies from one coalfield to another they will almost certainly not be available in the places required. South Wales, for example, will require only 2 per cent. fewer men in 1965 than in 1949. But where so much is uncertain perhaps it would be unwise to make too much of this. The assumptions about wages are extremely obscure, though they have a critical bearing on the plan. It is estimated that earnings per man-shift will rise with increasing productivity by about 9 per cent., though output per man-shift will rise by about 30 per cent.[2] This suggests an optimistic view of future piece-work bargains, though the relative stability of day-wage rates has to be reckoned with. As regards the assumptions about the demand for coal 'from which all else proceeds', we have already expressed some doubt about the estimate of future export requirements—given the cost of meeting them.

[1] It may be that 'social considerations' have been allowed to bias these results. As previously noted, the only cases in which specific adjustments for this reason are admitted are those of Cumberland and West Durham.

[2] According to the present writer's calculations. No figure for output per man-shift in 1965 is given in the plan.

In this review of the long-term capital expenditure programme of the N.C.B. I am very conscious of having ignored many complexities which need to be resolved before the economist can give a confident appraisal of its worth. Thus, for example, we have previously mentioned the enormous difficulties confronting the Board in its attempts to evolve a rational price structure.[1] The relative valuations of different coals has obviously a profound effect on the framing of capital investment programmes and vice versa. Moreover, the reactions of consumers have to be reckoned with and these may change when an over-all shortage of coal no longer exists. But where so many guesses have to be made about a very uncertain future perhaps, after all, these are only minor difficulties.

The *Plan for Coal* reveals the almost insoluble problems of planning in large nationalized industries, but it is nevertheless a most courageous and praiseworthy effort. Economists will be grateful for so much information on the framing of business policy. In the main, the N.C.B. has proceeded along lines which they will find intelligible and can commend—given the fact of nationalization and the terms of the Nationalization Act to which the Board has had to accommodate itself.

UNIVERSITY COLLEGE
OF SOUTH WALES AND
MONMOUTHSHIRE
CARDIFF

[1] See Annual Reports of the National Coal Board.

SOME THOUGHTS ON THE DISTRIBUTION OF EARNINGS[1]

By A. D. ROY

I

An attempt has been made elsewhere[2] to show that the output of any individual working by hand is the resultant of a large number of random influences. As a first approximation these influences can be assumed to operate independently, i.e. they are not significantly associated with one another. The rather vague term 'influence' is intended to refer to such factors as health, strength, skill, and so on. The suggestion was made that it is more fruitful to define such factors so that, taken singly, they exercise the same proportionate effect on the output of otherwise similarly situated individuals rather than the same absolute effect. In other words, it is more reasonable to say that a given loss of health will depress a worker's output by, say, 10 per cent., other things being equal, than by, say, 10 units.

If this viewpoint is acceptable, then it necessarily follows that the distribution of individual output will tend to be such that the logarithms of output in a given period have a 'normal' frequency distribution, provided that certain very general conditions are fulfilled. At least, this would be the form of the distribution of individual output if the whole working population were producing the same goods by hand, or if, considering a single occupation, each member of the working population had the same chance of being employed in this occupation. In practice this is very unlikely to happen since those persons engaged in a particular occupation tend to be selected in a purposive manner from the working population as a whole.

The purpose of this article is to discuss one possible and fairly simple method of selection and to investigate, as far as possible, its effect on the distribution of output (and of earnings) and on productivity in the various occupations of a community.

In part, too, this article is intended to combat the view, which appears to be implicitly held by many, that the distribution of incomes is an arbitrary one that has developed by the process of historical accident. Such a distribution ought then to be modified, so the argument runs, and such a change cannot but be for the better. Such a contention may well be partly true so far as property incomes are concerned, but at best it seems

[1] My thanks are due to Dr. A. R. Prest, Fellow of Christ's College, and to Mr. C. F. Carter, Fellow of Emmanuel College, for reading this article in typescript and for their valuable comments. Naturally the responsibility for the views expressed and for all errors is entirely my own.

[2] See 'The Distribution of Earnings and of Individual Output' (*Economic Journal*, September 1950).

to be a dangerous half-truth if it is applied to earned incomes as well. It will be shown here, albeit with many simplifying assumptions, that whatever the rates of remuneration which either rational choice or irrational prejudice allocate to the units of output in different occupations, such scales of relative rewards exercise no more than a superficial distorting effect upon a basic pattern. This underlying pattern is independent of the subjective feelings of consumers and of entrepreneurs and is determined by objective facts. It depends, in other words, upon the varying relative effectiveness of human abilities when faced with different kinds of productive problems and can be altered only by changes in the techniques of production in the various activities in which the human race engages. Manipulations of scales of payment may result only in the near extinction of certain occupations in the long run.

In order to establish these conclusions, many assumptions must be made to simplify the argument, which must necessarily be conducted in terms of a remote and abstract world. Later, when the points of substance have been underlined, an attempt will be made to bring the discussion nearer to life as it really is or, perhaps more accurately, as it seems to be.

It is to the first of these tasks that the intellectual effort must now be applied.

II

To begin with, let a very simple community be considered in which a member of the working population has the choice of only two occupations: hunting, and fishing, for example. Every such individual is quite free to move from hunting to fishing as and when he chooses. No autocrat headman has decided that those men whose names begin with letters A to L shall be hunters willynilly and the remainder fishermen. In this simple and idyllic existence even Nature herself has taken on an unwonted simplicity. The hunters, try as they will, can only snare rabbits of identical weight and succulence, while the fishermen's trout invariably weigh 1½ lb. each.

The council of elders in the village in their savage ignorance have not yet discovered any device that improves upon the free operation of the price mechanism.[1] Demand and supply tend to establish prices for a standard rabbit and for a trout in terms of the local currency of cowrie shells. If every adult male fished for a year the distribution of the logarithms of output of fish would be normal. Similarly, if they all hunted for a year the distribution of rabbits caught by individuals would have the same form. There is, of course, no reason to suppose that the shape of

[1] Capital equipment is renewed and new investment in fishing-tackle and snares takes place on days specially set aside for this purpose. Investment is the responsibility of the community as a whole and not of individuals.

these two distributions will be the same. The rabbits are plentiful and stupid and even the less skilled man can ensnare a fair number in a year's hunting while the exercise of a quite appreciable degree of skill does not enable the better hunters to catch many more. The trout, on the other hand, are particularly wily and fight hard, so that many men would undoubtedly starve if they had to eat only what they themselves caught; but nevertheless the real fisherman can obtain very big catches in a year's fishing, although such catches are pretty rare occurrences.

The distribution of hunters' output may thus be said to be much more 'concentrated'[1] than the distribution of fishermen's output. Nor is this all, for it is possible that a considerable degree of association may exist between individual performances as hunters and as fishermen. There may be a marked positive association so that the best hunters and fishermen are, generally speaking, the same people, or the association may be negative so that the best hunters generally make the worst fishermen and conversely.

When there exists no tendency for the numbers of hunters and of fishermen to change at the ruling prices for fish and rabbit, it must be the case that no individual can improve his position by changing his occupation. Among these simple-minded people the net advantages of an occupation are represented solely by the annual earnings in cowrie shells. Every man, too, has a fairly good idea of what his annual output is likely to be in both occupations. In the long run, then, the proportion of the total number of adult males in each occupation will be equal to the chance that the annual earnings of any male, chosen at random, will be higher in that occupation than in the other.

First, let the occupation in which the distribution of output is the less concentrated be considered, that is, the business of fishing. Whatever the relative prices of fish and rabbit, the distribution of output resulting from the selective process outlined above will be of the same general form. Those men who are the very best fishermen will all spend their time fishing and, as progressively lower outputs of fish are considered, the proportion of men who fish rather than hunt will decrease steadily until virtually none of the potentially worst fishermen of all find it worth their while to fish.

In the other occupation of hunting, matters are not quite so simple, for this is, in a sense, an inferior occupation because the potential individual performances are much more concentrated. It is possible to distinguish three possible eventualities. If the association between output of fish and output of rabbit is, in general, either positive but sufficiently small, or negative, the distribution of output of rabbit, after the selective process has operated, will be of the same general form as the distribution of output

[1] The 'concentration' is inversely proportional to the dispersion of the logarithms of individual output.

of fish, i.e., most of the potentially good hunters will hunt and virtually none of the potentially bad hunters will do so.

If, however, there exists a substantial positive association between hunting and fishing performance, while at the same time potential rabbit output is significantly more concentrated than potential fish output, it will not be possible to get both many good hunters and many good fishermen. In fact, since hunting performance is more concentrated, those people who take up hunting will include a very large proportion of the worst hunters and very few of the better ones. This, then, is what makes hunting the 'inferior' occupation, since the requirements of fishermen must necessarily be satisfied primarily from amongst those people who are potentially both the better fishermen and the better hunters while the hunting profession must be content with what is left over.

It may be, however, that there is a certain positive association between hunting and fishing prowess and that the concentrations of individual performance in both occupations stand in such a relation to one another that the same proportion of all grades of hunters find it worth while to adopt this occupation exclusively. Such a situation is clearly a limiting one, intermediate between the two discussed previously. In this case and in this case only will it be true that the distribution of individual output of rabbits is actually, as well as potentially, normal in the logarithms of output.

It is instructive to consider the implications, as far as productivity in the two occupations is concerned, of the sudden increase in the popularity of trout relative to rabbit in the community's diet. The price of trout relative to the price of rabbit will rise and it will become advantageous for certain men to give up hunting and take up fishing instead. If the association between individual rabbit output and trout output is negative, zero, or sufficiently small and positive, those men who now become fishermen will on the average have lower outputs of fish than those who were fishermen before the demand for fish increased. Productivity in the sense of average output per head in the fish industry will thus fall. But these same men will be those whose output in the rabbit industry is on the average lower than that of the men who find it worth while to remain hunters, even though the price of rabbit in terms of trout has fallen. Productivity in the meat trade will thus rise.

If the association between outputs in the two occupations is positive but not sufficiently small, productivity among the fishermen will still fall, but now the men moving from hunting to fishing will be those whose hunting output is on the average higher than that of the hunters left behind. Productivity in terms of rabbits per hunter-year will thus fall. Hence the attempt to satisfy the increased demand for trout has resulted in a fall in productivity in both occupations.

In the limiting case when the association between outputs has a certain positive value, the average output per head in rabbits of hunters turning over to fishing will be the same as the average output per head of those who remain hunters and in this case, while productivity will of course fall in fishing, hunting productivity will remain unchanged.

The reader should have no difficulty in adapting the reasoning to the situation arising if the community's preferences changed in favour of rabbit.

III

The cases discussed so far have been perfectly general ones, but in order to obtain a further insight into the working of this simple model, further consideration must be given to two special cases.

Suppose now that villager Ay Bee is the star fisherman of the community and also the best hunter. The 'average' man Ell Emm is ranked fifty-seventh, say, in order of merit both as a fisherman and as a hunter, while poor old Wy Zed is the most incompetent villager in both occupations. In general, any villager's position at the end of the season would be the same if the entire community decided to devote themselves to hunting or fishing exclusively. It still remains true, however, that individual catches of trout tend to be much more differentiated than individual bags of rabbits.

When the supply and demand for fish and meat have been equated at the current price, it will be found that all the fishermen have outputs greater than or equal to a certain minimum level determined by the relative prices of rabbits and trout, and that all hunters have outputs less than or equal to a certain maximum value, similarly determined. Furthermore, the minimum earnings of fishermen and the maximum earnings of hunters will be equal. The distribution of the logarithms of earnings for the whole community will be a sort of composite normal distribution, with a relatively high dispersion in the upper section of the range and a lower one in the bottom section.

Suppose now that, for some reason such as changes in the habits of both rabbits and trout or alterations in hunting and fishing technique, the individual performance as hunter and fisherman tend to have the same pattern so far as the concentration is concerned. The more similar such patterns become, the greater will be the movement of men from one occupation to another induced by a given small change in the relative prices of fish and meat. Finally, if the patterns become identical there are only three possible positions of equilibrium. For if the ratio of the price of fish to the price of rabbit is greater than a certain value, everyone will opt for fishing, while if the ratio is less than this the whole of the labour force will take up hunting. When the price ratio is exactly equal to this limiting

value, every man will find that he can earn the same number of cowrie shells whichever occupation he takes up and he will therefore be indifferent as to the one he enters. It seems reasonable that the possibility of mental breakdown on a large scale ought to be ruled out, and that it may be assumed that under these conditions half of the adult males will start to fish and half to hunt.

This example serves to illustrate the fact that when the association between outputs in the two occupations is high, the differing rates of payment per fish and per rabbit will not be an efficient selective device unless the patterns of output in the two occupations are substantially different.

The other special case arises when the qualities required of a fisherman and a hunter are such that Ay Bee, the best fisherman, finds himself the worst hunter, while Ell Emm, who ranks fifty-seventh from the top as a fisherman, now ranks fifty-seventh from the bottom as a hunter. Wy Zed has recovered most of his self-esteem because, although he is still an impossible fellow to trust with rod and line, he now has no equal with the snare or the ferret. In general, the ranking of each individual would be exactly reversed if the whole village gave up fishing in favour of hunting, or vice versa.

Now it will be found that every fisherman catches at least a certain minimum of fish while every hunter bags at least a certain amount of rabbits, once the prices and the consequential distribution of the labour force have equilibrated supply and demand. Everyone will earn at least a given minimum of cowries, and these minimum earnings will be the same for both fishing and hunting. The distribution of earnings can be obtained by considering that arising in the previous case discussed and then folding over the lower section of the distribution with the smaller dispersion and superimposing it upon that part with the greater dispersion.

In this situation it does not matter whether the patterns of hunting and fishing performance become the same or not, for the method of selection will not be faced with a problem that it cannot resolve.

In the first instance, it was true that all fishermen had higher earnings than any hunters and consequently fishermen might be expected to acquire a superior social status. In the second case, no such broad generalization could be made, but nevertheless there is reason to believe that even in this case fishing would be the right thing for nice people to do. For if a high enough level of earnings is chosen, the level being dependent on the prices of both fish and meat, it will always be found that, among the men with earnings greater than this, fishermen predominate. In this particular sense, then, it is true to say that fishing is the 'better paid' or 'superior' occupation. Although this result has been mentioned in the discussion of two special cases, yet in fact it has a far more general application. For,

whatever the degree of association between individual hunting and fishing performance, and whatever the relation between the prices of fish and rabbit, it will always be possible to find a level of earnings above which there are more fishermen than hunters, provided that, of course, individual performances are more concentrated in hunting than in fishing. An attempt to raise the status of hunting by offering increased prices for rabbits only increases the level of earnings above which fishermen are in a majority.

IV

So far the discussion has been confined to a very simple sort of community, but it appears worth while to see what will happen in a more sophisticated township. The inhabitants have now found that, once they have eaten their fill, there are a great variety of pursuits that can be employed to while away the time. The intelligentsia are well aware of the undesirability of encouraging monopolistic competition by product differentiation and it has been ordained that any manufactured article must conform precisely to certain approved specifications. Nevertheless, a great many different kinds of goods are demanded by the community in widely varying quantities.

The passage of time and the concomitant progress have not altered the essential character of this happy people; they still tend to take up the occupation which offers the greatest reward. The existence of many alternative occupations makes the results of the selective process rather more varied, but even now certain broad generalizations can be stated.

Fishing still remains the most respected profession although it is closely rivalled by the writing of scientific papers of uniform quality, exactly 6,000 words long. The catching of rabbits occupies an intermediate position in the hierarchy, while the choppers of wood and the fillers of standard size water-buckets are, respectively, the least but one and the least esteemed of occupations. In other words, fishing performance is still the least concentrated while the drawing of water is the most concentrated in the sense used earlier in this article. Everybody in the community is capable of producing some output in every occupation, although in some lines of activity there are many men whose potential output is not far removed from zero.

Whatever the prices established by supply and demand and whatever the degree of association between individual potential performance in each pair of occupations, fishing will always attract most of the good fishermen and virtually none of the bad ones. If each association is less than or equal to zero or is positive but sufficiently small, given the varying degrees of concentration of performance in different activities, every occupation will attract a high proportion of the better men and the proportion will steadily

fall as less and less able men, in so far as this particular occupation is concerned, are considered. If these conditions are not satisfied, it will be found that the men who are forced by circumstances to devote their lives to providing the water-supply will include a very high proportion of those who are very inefficient water-carriers and this proportion will fall steadily as the potentially more efficient water-carriers are considered. In the other intermediate occupations the proportion of workers of different levels of competence will not increase or decrease steadily with competence as is the case with fishing and watering respectively, but over some ranges of potential output the proportion will rise and over others it will fall. The general effect will be that for the higher forms of activity the distribution of output of those who take up this occupation will approximate to the distribution of output of fish, while for the more lowly sorts of occupation, the distribution of output will tend to be like that of the output of buckets of water.

As in the two-occupation community, there exists a limiting situation in which the water-drawing profession will attract a constant proportion of workers at every level of efficiency in this activity.

If conditions are such that it is possible to disentangle the best workers in each occupation while at the same time leaving sufficient competent men for the other activities, an increase in the demand for the product of any kind of industry will clearly cause productivity in that occupation to fall and in all others to rise. If such an unravelling process cannot be effectively carried out, the result of such an increase in demand on the particular industry concerned will obviously vary, but the effect on productivity in other activities can be stated more definitely. Productivity in fishing will clearly rise, in science it will probably rise, but nothing can be said about hunting. In the firewood industry productivity will probably fall, while amongst water-carriers it will certainly fall.

A further clarification of thought will probably ensue, if two special limiting situations are discussed in a little more detail. First, let it now be supposed that Ay Bee, the great-grandson of the earlier villager of the same name, is the undisputed *victor ludorum*, for he excels in the catching of fish and the writing of theses and can fill more buckets of water in a year, if he is put to it, than anyone else. In short, he can do everything better than anyone else. Everyone has the same ranking in each occupation and poor Wy Zed is as clumsy with buckets of water, and everything else, as his great-grandfather was with a fishing-rod. Then the highest earnings will be obtained by the fishermen and next highest by the writers of theses, while the lowest earnings will be received by the water-carriers. Furthermore, the least earnings of the fishermen will be equal to the greatest earnings of the academics, and so on. For certain levels of prices

it may not be worth while for anyone at all to enter some occupations, but, with this reservation, whatever the relative prices, the incomes earned in a particular activity will be greater than any earned in occupations in which the performance of individuals is more concentrated and less than any earned where individual performances are less concentrated. Thus, any attempt to reduce the earnings in a particular occupation relative to the others simply serves to reduce the numbers of workers in this line and those that remain occupy the same position in the hierarchy of earnings as before.

Under the circumstances described, the distribution of earnings in the whole community is such that the logarithms of earnings are distributed normally with different dispersions over different sections of the range. At the top end of the range the dispersion is at its greatest and it diminishes by finite steps as movement is made from the top to the bottom of the range.[1]

The other situation worth examining is that existing when there are two groups of occupations within each of which the ranking by individual output is the same in every occupation but such that for any pair of occupations taken from different groups the ranking is exactly reversed. Young Ay Bee is champion fisherman, hunter, and log-chopper, but he is the worst performer at the writing of scientific papers and water-carrying. Wy Zed excels at the two last-named activities but is the most incompetent at the three first named. When the demand and supply for the various products are in equilibrium, it will certainly be true that the worst fisherman earns the same as the best hunter and the worst hunter the same as the best log-chopper. Similarly the sparsest output of scientific effusions will earn more than the greatest output of buckets of water. It can also be stated quite definitely that if a high enough level of earnings is chosen, there will be more fishermen with incomes greater than this than scientists; while if a low enough level of earnings is selected, there will be more water-carrying incomes below this level than log-chopping ones. Nothing further can be said about the intermediate occupations, and this rather odd case provides a 'partial' exception to the rule stated in the last paragraph of section III.

If any two or more occupations, for which individual performances are positively associated, are such that these performances have the same degree of concentration, it will be possible to find prices of the products of these activities that induce equal numbers of workers to take up employment in each of these occupations. But if the prices are slightly disturbed

[1] Such a distribution if plotted on logarithmic probability paper would not appear as a straight line but as a series of straight-line segments convex downwards towards the right-hand bottom corner of the sheet.

from this relationship the total labour force in these two or more occupations will move into just one of the activities. This is just another example of the necessity for the differences in concentration of individual performances, if the method of selection is to work properly when associations are high and positive.

V

The argument has now reached the point where it seems advisable to try to remove some of the simplifying assumptions on which it has rested so far. As progress takes place, or rather as the community becomes industrialized, which may or may not be the same thing, each worker will not be rewarded by the price which a unit of his product fetches in the market, instead he will be paid a wage by his employer. Where this reward is related simply and directly to his output the analysis clearly needs no modification. If a worker's reward is not in the short run connected with the output he produces in a given period, it does not follow that it is not so connected in the long run. For it is an accepted fact that every time-wage must be related to the expected output of a worker. Thus, the previous analysis, while not seeming to be immediately applicable to real conditions, may be fairly considered to deal with the fundamentals of the situation rather than with superficial appearances. This sort of approach must also be valid when dealing with wage systems of the bonus type, which are based partly on time and partly upon output.

What will happen as techniques are improved and as handicraft gives way to machine operation? The answer to this question depends upon the effect of such innovations upon the concentration of individual performances. It is a characteristic of machine operation that only part of the time of each cycle of operation varies with operators' differences in skill and aptitude. Machines are run at constant speeds and the machine time for any operation is thus fixed. This means that the outputs of individuals working with machines are likely to be more concentrated than those of people working with their hands at jobs requiring similar skill. It may be, of course, that machine working requires human qualities which were not needed when the job was done by hand and in this case the change-over might cause the concentration of individual performances to be lessened. In general, however, it may be expected that the advent of machines will increase concentration and hence, other things being equal, an occupation will move to a lower position in the hierarchy of activities. If a sufficiently high level of earnings is chosen, fewer workers in the occupation with earnings higher than this level will be found than was the case before the introduction of the machines.

More generally, innovations may be considered to be of three kinds.

There are those which raise the output of all individuals in the same proportion, those which raise the output of the better workers in a greater proportion than the output of the worse workers, and lastly those which raise the output of the worse workers proportionately more than that of better ones. Whatever the effect of such innovations upon the price of the product and the consequential change in the rate of remuneration of the workers, the first sort of innovation will, other things being equal, leave the status of the occupation, as determined by the highest incomes, unchanged. The second type of innovation will raise the position of this activity relative to other activities, while the third kind, paradoxically, will diminish the status of the occupation despite the fact that the productivity of the least efficient has been brought up towards that of the best workers.

Is this result so paradoxical after all? If 'anybody can do it', there is no reason to esteem or pay very much for its performance. If only a few persons are sufficiently gifted to reach a moderate level of competence, any sort of demand for their services is likely to result in some at least reaping high rewards. At the moment there is much talk of the evils of levelling downwards and of the desirability of trying to level upwards. If there is anything in the argument put forward here, the process of levelling inevitably operates downwards, in so far as any profession is judged by the highest incomes which its practitioners may earn.

It should be apparent that the analysis attempted in this article bears some sort of affinity to the theory of comparative advantages. A situation has been examined in which individuals' comparative advantages in various activities differ widely. The advantages are of such a nature, due to the hypothesis that output is likely to be distributed normally in its logarithms, that variations in flat rates of reward per unit of output are never sufficient to destroy them entirely, although the number of people who can exploit them may be progressively diminished.

VI

In the discussion of the primitive community, the assumption of perfect occupational mobility was made. For a more advanced society, such an assumption leads to an air of artificiality. In the short run, at all events, workers will not switch jobs just because their earnings are likely to be increased but, if they are rational, they will consider the costs incurred by such a change and the differences in the 'net advantages' of alternative occupations. If, however, the longer run is considered, a worker who is just entering the labour force will incur no such costs, provided always that he can find employment in the occupation of his choice near his own home.

The application of the foregoing analysis must therefore be limited to the long run.

To deal with the problem of costs of geographical movement necessarily incurred by a person entering an occupation and with the difficulty caused by worker's preferences for certain jobs even when no differences in earnings exist, use must be made of the concepts of the 'average cost of movement' in terms of the output of the particular occupation and of the 'average net advantage', also reckoned in terms of output. If, then, any worker's most profitable activity is to be found, his earnings in any occupation must be calculated by considering his 'notional output' multiplied by the appropriate piece-rate, where his 'notional output' is equal to his actual output less the 'average cost of movement' and plus the 'average net advantage'.

This kind of modification is obviously a very tiresome one and it must be hoped that, in general, the corrections necessary are sufficiently small to be neglected. It does not seem likely that they will be of sufficient importance seriously to modify the conclusions of this argument based upon the more simple assumptions. Nevertheless no deduction based upon the properties of this naïve model ought to be applied to the real world, without bearing in mind at least some of the assumptions that ought in principle to be removed.

VII

The results of the previous analysis will now be briefly summarized. It has been shown, granted the truth of the particular assumptions made, that the distribution of earnings depends on certain 'real' factors, i.e. the character of the distributions of various kinds of human skill and the state of technique existing in different occupations. The desires of the individuals in the community for various sorts of goods are naturally of great importance too, but they are only able to exert their influence within the framework determined by skill and technique.

It must be emphasized that the conclusions reached are dependent upon the particular kind of distribution of individual output assumed at the start of the discussion. They would not necessarily be true if other types of distribution were considered. The choice of the particular form of distribution is not, however, an arbitrary one but has a reasonably plausible empirical basis.

In an analysis like this there is little chance of stumbling upon new or startling truths. Nevertheless, a fairly detailed examination of this sort seems worth while if only it serves to illuminate familiar and commonplace phenomena from rather different angles.

UNIVERSITY OF CAMBRIDGE

THE SHARE OF WAGES IN THE NATIONAL INCOME

By F. H. HAHN

THE analysis of distribution, up to now, has always been conducted on the basis of the behaviour of an individual firm or industry under certain restricted conditions. The modern theory of the behaviour of individual units of decisions, however, exhibits a curious lack of uniformity. Individuals are assumed to maximize utility in their role of consumers and as suppliers of labour, yet entrepreneurs are always assumed to maximize money profits. But it is only under very special assumptions that maximum money profits are synonymous with maximum utility. Not only is it untidy to make two entirely different assumptions concerning the behaviour of individuals in their role as entrepreneurs and in all their other activities, it is also likely to lead to error in analysis. In particular, whenever production is carried on under uncertainty, it is almost certain that producers will not maximize their money profits.

It is the purpose of this paper[1] to present a macro-economic theory of distribution based on the assumption that entrepreneurs maximize an index of utility rather than their money profits. It is well known that this assumption interpreted with the greatest generality can only lead to a number of classificatory results, for while the sign of the substitution term is always unambiguous, that of the income term is not.[2] To avoid this

[1] I am indebted to Mr. G. D. N. Worswick for valuable criticism of this paper.

[2] An individual is assumed to maximize his (index of) utility given by

$$U = f(x_1, x_2, \ldots, x_n), \tag{i}$$

where U is the index of utility and $(x_1 \ldots x_n)$ are n commodities, subject to the budget constraint

$$\sum_{i=1}^{i=n} p_i x_i = I, \tag{ii}$$

where p_i is the price of the ith good and I is the income of the individual per 'maximizing period'. The maximum conditions yield us n equilibrium equations of the form

$$U_{x_i} = \lambda p_i, \tag{iii}$$

where U_{x_i} denotes (partial) differentiation with respect to x_i and λ is a Lagrange multiplier normally interpreted as the marginal utility of income. From these n equations we can derive the equilibrium quantities consumed. If these are to correspond to a true utility maximum, the second-order (sufficient) conditions yield

$$\frac{\partial x_i}{\partial p_i} + x_i \frac{\partial x_i}{\partial I} < 0, \tag{iv}$$

which is the famous Slutzky condition, and when the first term represents the change in the consumption of x_i when p_i changes and incomes are so adjusted as to leave U constant. This term must always be negative. For consider two positions X^0P^0 and $X'P'$ on the same indifference surface. Then maximizing behaviour implies $\Sigma P^0X' > \Sigma P^0X^0$ and $\Sigma P'X^0 > \Sigma P'X'$, from which we easily find that $\Sigma (P'-P^0)(X'-X^0) < 0$. Putting this in

classification (which the reader can always do for himself) we have assumed the entrepreneur's preference function to be of a particular form. This is equivalent to assuming the income term always to be of a certain sign. This assumption has the advantage of enabling us to formulate definite propositions which can be tested against actual observed behaviour of entrepreneurs.

Making use of the above assumptions we shall derive an aggregate supply curve of output as a function of the net profit margin (rate of profit on output). We shall show that in certain circumstances the relation between the net profit margin and the share of wages is constant, so that the aggregate supply of output can equally well be expressed as a function of the share of wages. Making use of the relation between the share of wages and the propensity to consume, and of that between investment and aggregate supply, we shall derive an aggregate demand curve. The equilibrium share of wages will then be that share which equates aggregate supply and aggregate demand. The similarity of our theory to the older theories of the wage fund will then be noted.

I

If there is a perfect (or near perfect) capital market, then at any one moment of time there will be some individuals on the margin of entrepreneurship and some entrepreneurs on the margin of expanding their output, or of entering some market other than their present one or producing some commodities they are not producing already. We shall assume that the factor restraining these individuals from becoming entrepreneurs, or expanding their output, &c., is uncertainty or, if we like, the general disutility of production. An individual entrepreneur is therefore in equilibrium, not when marginal profit is zero, but when the marginal rate of transformation of output into profit is equal to his (subjective) marginal rate of substitution of output for profit. Whether or not this equilibrium is achieved on the basis of mathematical expectations and whether individuals 'quantify' their subjective feeling of uncertainty, or whether they estimate potential surprise, is irrelevant to the present discussion. All that our assumption comes down to is that uncertainty tends to restrain individuals from enterprise and a high rate of return to induce them towards it.

We shall assume that entrepreneurs always expect the present state of affairs, i.e. price, demand, costs, &c., to continue over their economic

differential form we have $\Sigma\, dpdx < 0$. Stability conditions, however, place no restriction on the second term in (iv) since the latter can be positive while (iv) as a whole remains negative. This second term shows the increase in x_i consumed when incomes rise and is normally called the income effect of a price change. For a full analysis see P. A. Samuelson, *Foundations of Economic Analysis*, Harvard Economic Studies, 1947, pp. 107–16.

Slutzky's result can easily be generalized to take care of the case where the utility function includes not only commodities but also services (normally treated as negative commodities).

horizon. We also assume that there is no taxation and that the prices of the goods entrepreneurs consume are constant. We can then write the utility function of our entrepreneur as

$$U = U(P, Ot, E, \lambda), \tag{1.1}$$

where P is profit, O is outlay, and t is the average rate of turnover, E is the amount of the entrepreneur's own labour, and λ is a parameter measuring residual uncertainties undertaken which are independent of

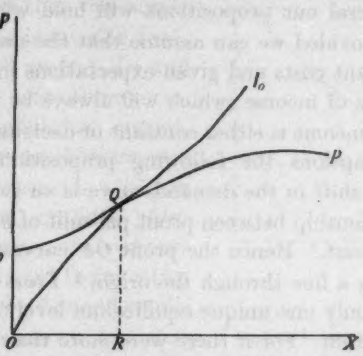


FIG. 1

O and t. U is an increasing function of P and a diminishing function of O, t, and E. If we further assume that there are only two factors besides the entrepreneur, labour and capital, and that they all three vary directly with output, and if λ is constant, we can rewrite (1.1) as

$$U = U(P, X), \tag{1.2}$$

where X is output.

Given the demand and cost schedules facing the entrepreneur we can write

$$P = P(X). \tag{1.3}$$

Hence maximizing (1.2) subject to (1.3) we obtain the equilibrium condition

$$\frac{U_x}{U_p} = P'(X).$$

(The subscripts denote partial differentiation.) These relationships are plotted in the diagram (Fig. 1).

Given the demand and minimum cost conditions, OP the profit curve is uniquely determined. $I_0 I_0$ is an indifference curve between output and profit. This curve will shift for any change in λ or t. OR is the equilibrium output, and the slope of the straight line OQ (not drawn) measures the rate of profit on output.

We now make our special assumption concerning the entrepreneur's preference function: it will be assumed that the income term is zero, i.e. that the above indifference curves are vertical projections of each other.[1] This assumption rules out a backward rising supply curve of output and it implies a constant marginal utility of income. Backward rising supply curves of output, except in one-man businesses such as small-scale farming, seem rare and can safely be ruled out. Constant marginal utility of income leads to logical difficulties,[2] and is assumed here only for the sake of simplicity. In general our propositions will hold whenever the income term is positive, provided we can assume that the marginal disutility of producing at constant costs and given expectations increases faster than the marginal utility of income (which will always be true as long as the marginal utility of income is either constant or decreasing).

From the assumptions the following propositions can be derived. Provided that any shift in the demand curve is an iso-elastic shift (horizontally), the relationship between profit per unit of output and marginal profit will be constant.[3] Hence the profit OP curves will be projections of each other along a line through the origin.[4] From this it follows that there corresponds only one unique equilibrium level output to any given (average) rate of profit. For if there were more than one level of equilibrium output which corresponded to any given rate of profit, this would imply that there is an indifference curve $I_1 I_1$ which to the right or left of Q has the same slope as $I_0 I_0$ at Q. This, however, would contradict our assumption.

It is easily seen that this result will still hold even when the income term

[1] Whenever the marginal utility of income (profits) is assumed constant, then using the notation of note 2, page 147, we write U_I = constant. Along any line vertical to the x-axis, X is constant and hence U_x is constant. Thus along such a line U_I/U_x = constant. But this ratio is the slope of any indifference curve lying on the vertical line. Hence the indifference curves are parallel or 'projections' of each other along a vertical line as defined above.

[2] See P. A. Samuelson, 'Constancy of the Marginal Utility of Income', *Studies in Mathematical Economics and Econometrics*, pp. 75–91.

[3] The increase in total profit (marginal profit) is equal to the difference between marginal revenue and marginal cost. This by a well-known formula can be written as

$$\frac{dP}{dX} = \pi\left(1-\frac{1}{e}\right)-c\left(1+\frac{1}{\eta}\right), \qquad \text{(i)}$$

where π is price, e the elasticity of demand, c is average cost, and η the elasticity of the cost curve. If now there is an iso-elastic shift in the demand curve as defined in the text, then at the same π, marginal profits will be the same as before, for we are assuming $c(1+1/\eta)$ constant. Further, at the same π, P/X, the profit per unit of output, will be the same as before. Hence the relationship between average and marginal profit remains constant. If we like we can say that an iso-elastic (horizontally) shift in the demand curve causes an iso-elastic (horizontally) shift in the profit curve.

[4] This follows from 3. For the slope of a line through the origin measures average profit. The slope of OP measures marginal profit. Hence, since the shift in the demand curve leaves the relationship between average and marginal profit unchanged, the OP curves must have the same slopes along a line through the origin.

is not zero but positive, as long as we assume the marginal disutility of producing to increase faster than the marginal utility of income. For if there were possible to any one profit per unit of output more than one equilibrium output, this would imply that the indifference curves are projections of each other along a line through the origin. This, however, contradicts our assumption concerning the marginal utility of income and the marginal disutility of producing.

It is further clear from the diagram and our assumption that the supply of output will be an increasing function of the rate of profit.[1] To any equilibrium rate of profit there corresponds a unique equilibrium output, and to any higher equilibrium rate of profit there corresponds a higher unique equilibrium output. Also granted our assumption of given constant costs (i.e. constant factor ratios and prices) and given demand conditions, there corresponds a unique share of wages to any given rate of profit. Since the share of wages is inversely related to P/X (the rate of profit), the supply of output will be a diminishing function of W/X (where W is the total wage bill). We now further assume that all firms behave in the fashion outlined above, so that aggregate supply is also an increasing function of the average rate of profit over the whole economy. This sort of approach gives rise to all sorts of difficulties known as the 'aggregation problem'. We could always get round this by dealing in as many supply schedules as there are firms. But for the purpose of this simple analysis we assume that the 'aggregation problem' has been solved somehow and that a meaningful supply curve for the whole economy can be plotted.

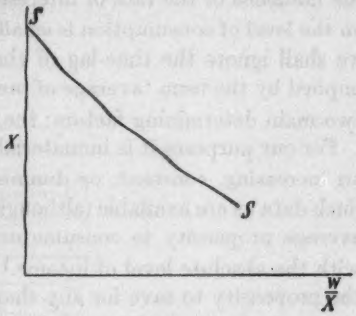


FIG. 2

The supply curve as a function of W/X is plotted in Fig. 2. Given any value of W/X we can read off the corresponding equilibrium value of X which is compatible with it. Or to put it differently, since in equilibrium demand must equal supply, the supply curve shows what the demand would have to be in order that any value of W/X should be an equilibrium value. In order to complete our analysis we must therefore examine the forces determining aggregate demand.

[1] For a producer producing under constant costs and faced with a downwards sloping demand curve, average profits will be falling with output. Hence, given our assumptions concerning the shifts in the demand curve, the higher the average profit the higher the marginal profit. But the higher the marginal profit (the steeper the slope of OP), the farther to the right will be the tangency of OP and any indifference curve, i.e. the greater will be output. And since the relation between average and marginal profit is assumed constant we can simply say that output will be an increasing function of average profit.

II

Aggregate demand is, assuming a closed economy, the sum of consumption and investment demand. We shall consider each in turn.

Consumption is a function of the level of income, the distribution of income, the rate of interest, the volume of real cash balances (M/P), and some average of previous incomes. In what follows we shall assume that the influence of the rate of interest and the volume of real cash balances on the level of consumption is small. Moreover, since our analysis is static we shall ignore the time-lag of changes in consumption habits which is implied by the term 'average of previous incomes'. We are then left with two main determining factors: the level and distribution of income.

For our purposes it is immaterial whether the propensity to consume is an increasing, constant, or diminishing function of the level of income. Such data as are available (although very scanty) seem to indicate that the average propensity to consume over normal times does not vary much with the absolute level of income.[1] In what follows we shall assume that the propensity to save for any share of wages is a constant proportion of the level of income. This assumption, however, is in no way necessary to our analysis.

That the propensity to consume is an increasing function of the share of wages seems generally recognized. The curve relating the level of consumption out of any given income to the share of wages therefore will be upward sloping. We shall further assume the slope of this curve to be steepest for low values of W/X and less steep for higher values.

This assumption is supported by the following considerations. When the share of wages is low, i.e. wage-earners are near or below subsistence,[2] an increase in that share is unlikely to increase their propensity to save. On the other hand, capitalists will have a high share and hence a high propensity to save. One pound taken from the capitalists, of which a fairly large fraction was previously saved, will, on transference to wage-earners, be almost wholly consumed. The effect of redistribution on the level of consumption will therefore be at its highest. When the share of wages is relatively high, the propensity to save of wage-earners will also be rela-

[1] See J. S. Duesenberry: *Income, Saving, and the Theory of Consumer Behaviour*, Harvard, 1949.

[2] It may be thought that the subsistence wage not only depends on the share of wages but also on the absolute level of income. This, however, is not so. For if at any value

$$\frac{W}{X} = \left(\frac{W}{X}\right)_0 \quad \text{and} \quad X = X_0,$$

wage-earners are at subsistence, then an increase in X to $X_1 > X_0$ at the same share of wages, will mean that employment has increased in the same proportion as X. For we are assuming constant returns. Whether or not workers are at subsistence depends therefore only on W/X and not on X.

tively high. First because subsistence needs are no longer so pressing and secondly because savings will become a social desideratum as employed workers acquire middle-class habits. Capitalists, on the other hand, will now have a lower propensity to save since, except in the very long run, capitalists' consumption habits appear to be fairly stable. The effect of redistribution in favour of wage-earners on the level of consumption, in this situation, will therefore be relatively small.

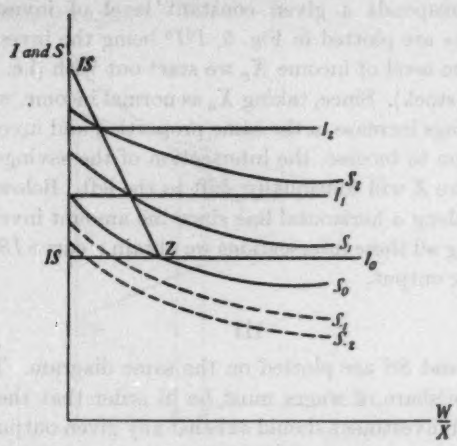


FIG. 3

For convenience of diagrammatic exposition the curves of savings rather than consumption are plotted in Fig. 3. Each of the *SS* curves relates to a given level of income.

Investment demand is here assumed to be a function of the rate of interest, the rate of change in income, and the stock of capital. Any investment demand schedule is only valid so long as the stock of capital is constant. Any change in the latter will shift the former. We must therefore start with a given stock of capital, and since we have assumed that there is no excess capacity, a given level of income. An investment demand schedule must therefore be understood to be valid only in the short run—or, to put it differently, our analysis applies to short-period flow equilibrium only.

Thus starting with any given level of income, equal to X_0, investment will rise more than in proportion to income for incomes greater than X_0, owing to the working of the accelerator. For incomes less than X_0 (remembering that at X_0 there is only autonomous and replacement investment), investment will remain constant.

We shall assume that investment demand is interest-inelastic. This,

while probably not completely true, appears sufficiently so for this level of abstraction. Lastly, our investment-demand schedule must be understood to show the amount that would be invested if any given level of income were produced. It is therefore a purely physically determined quantity (it will be remembered that we are assuming constant factor ratios) and takes no account of expectations. Once the level of output is determined, the amount invested is also determined. Therefore to each output produced there corresponds a given constant level of investment. The investment curves are plotted in Fig. 3, I^0I^0 being the investment curve appropriate to the level of income X_0 we start out with (i.e. representing the given capital stock). Since, taking X_0 as normal income, when incomes rise above it savings increase in the same proportion and investment more than in proportion to income, the intersection of the savings and investment curves above Z will continually shift to the left. Below Z the intersections will lie along a horizontal line since the amount invested remains constant. Joining all these intersections we obtain a curve IS which is the demand curve for output.

III

In Fig. 4, IS and SS are plotted on the same diagram. The curve IS tells us what the share of wages must be in order that the demand for consumption and investment should exhaust any given output. The curve SS shows us what the share of wages must be in order that any given output be supplied. The intersection of these two curves gives us the equilibrium value of the share of wages. This equilibrium value is stable when SS cuts IS from below. This is so for the following reasons. Suppose W/X greater than its equilibrium value, say, OR. But at OR, RP is supplied. But when RP is supplied, and investment appropriate to that income made, the share of wages for which savings are equal to investment is $OS < OR$. Therefore at the share of wages OR, demand will exceed supply and prices will rise and, given constant factor prices, W/X will fall. Similarly for any value of W/X below the equilibrium value, savings will exceed investment (there will be excess supply) and prices will fall and W/X rise.

Any fall in money wages will tend to shift the supply curve. The average rate of turnover of capital will be increased, or reduced, according as the elasticity of substitution (σ) is greater or less than unity, for the elasticity of substitution will determine the change in the ratio of total wages to non-wage payments (the latter being assumed to have a lower rate of turnover). In so far as uncertainty is a diminishing function of t (the rate of turnover), the supply curve will shift to the right or left according as σ is greater or less than unity. The supply curve will also

tend to shift to the right,[1] since the amount of money capital used per unit of output will be reduced, irrespective of σ. Hence if $\sigma \geqslant 1$, SS will shift to the right for the above reason and the share of wages will tend to diminish. The demand curve will, however, tend to shift to the right since less investment is needed per unit of output. This will tend to increase the share of wages.[2] No *a priori* solution of the effect of wage reductions on the share of wages can therefore be obtained. Exactly the same applies to a rise in money wages.

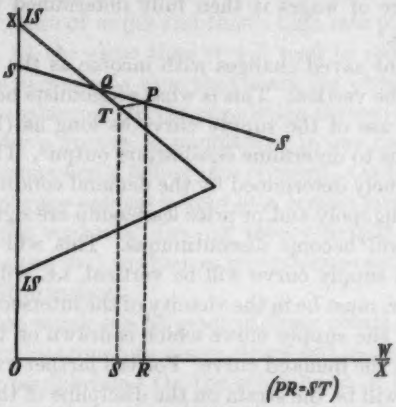


FIG. 4

A higher degree of monopoly ($1/e$) associated with any given output, i.e. a fall in the elasticity of the individual demand curves facing producers, costs being assumed constant, will reduce the marginal profit on output. Remembering our assumptions concerning the entrepreneurial preference function, the supply curve will be shifted to the left and the share of wages will therefore be increased. A fall in the degree of monopoly will shift the supply curve to the right and reduce the share of wages (see below, n. 2).

[1] Whenever $\sigma \neq 0$, i.e. whenever there is some substitution, the relation between W/X and P/X will be disturbed. Hence the supply curve will shift on that account alone. If $\sigma > 1$, then to any value of W/X there will now correspond a greater value of P/X and the supply curve will shift to the right. When $\sigma < 1$, the reverse is the case.

[2] If the demand curve did not shift, then when $\sigma > 1$ the share of wages would diminish. This seems to contradict accepted theory. But since we have assumed that output will increase, and that

$$\left(\frac{dI}{dX}\right)_{\frac{W}{X}\,=\,\text{constant}} > \left(\frac{dS}{dX}\right)_{\frac{W}{X}\,=\,\text{constant}},$$

in order that this higher output be an equilibrium output the share of wages must diminish, i.e. the propensity to consume must fall. The classical result by which $\sigma > 1$ increases W/X is obtained by neglecting both profits and aggregate demand and assuming supply infinitely adjustable.

Changes in entrepreneurial expectations, as well as changes in the general degree of certainty (however defined), associated with any given situation will also shift the supply curve. Adequate allowance for such shifts must be made if our diagram is to be used to deal with such phenomena as the trade cycle.

Lastly we may note some special cases.

(1) If the marginal disutility of producing and the marginal utility of income are both constant, all other assumptions being given, *SS* will be vertical. The share of wages is then fully determined independently of demand conditions.[1]

(2) If the amount saved changes with income as the amount invested does, then *IS* will be vertical. This is what economists have called neutral equilibrium. The use of the supply curve as long as (1) does not hold, however, enables us to determine equilibrium output. The share of wages in this case is uniquely determined by the demand conditions.

(3) Whenever oligopoly and/or price leadership are significant the profit curve of Fig. 1 will become discontinuous. This will imply that over certain ranges the supply curve will be vertical, i.e. will exhibit a kink.[2] This kink, however, must be in the vicinity of the intersection of the normal supply curve (i.e. the supply curve which is drawn on the assumption of no oligopoly) with the demand curve. For the farther away it is from the latter the greater will be the strain on the discipline of the group.

IV

In conclusion, our theory may be compared with that of the wage fund. According to the latter, the share of wages is strictly limited by the amount capitalists are willing to save and invest in variable capital. The level of employment was therefore determined by this amount and the workers' propensity to consume (assumed equal to unity). As the stock of capital grew and real wages rose, the share of wages would also increase owing to diminishing returns (i.e. the rate of profit would fall). This would make capitalists unwilling to accumulate farther, and the share of wages would fall again.

[1] A constant marginal disutility of producing implies that the indifference curves of the entrepreneur are straight lines, i.e. have constant slopes. Thus the equilibrium slope of the profit transformation curve *OP* (marginal profit) must be constant for all outputs since in equilibrium the latter curve is tangential to an indifference curve. We have already seen that on our assumptions a constant marginal profit implies a constant average profit. Therefore the supply curve is perfectly elastic with respect to average profits.

[2] When there is oligopoly, the producer is faced with a discontinuous profit transformation curve. There he will supply certain ranges of output at the same profit margin. For that range the supply curve will be vertical. But for outputs falling outside that range, the supply curve will have its normal shape, i.e. he will supply more only if average profits increase. Hence there will be a kink in the supply curve.

There were of course many variants of this theory. According to Malthus, for instance, the share of wages would be kept constant by a growth in population. According to Marx, who allowed for unemployment, the rate of profit would fall once full employment had been reached, owing to the rise in the organic composition of capital, and this would reduce accumulation.

Our theory has a certain amount in common with these older propositions. According to it, a high share of wages by lowering the rate of profit will tend to reduce output. At the same time it will increase demand. Conversely a low share of wages and thus a high rate of profit will tend to increase output. At the same time it will tend to reduce demand. The equilibrium share of wages is thus that share for which these conflicting forces are exactly balanced. In the population theory, the share of wages is kept in check by a growth in population, in our theory by the rising propensity to consume and a falling rate of profit. On the Marxian theory the share going to wage-earners is kept at a certain level by a falling rate of profit, as output expands. On our theory output can only expand (except in special cases such as changes in confidence and (1) and (3) above) if the rate of profit increases.

Of course not too much can be made of these points of similarity. Our theory is hedged in by numerous assumptions and in any case applies only to short-run flow equilibrium. On the other hand, it is precisely on the basis of short-run analysis that latter-day classicals such as Taussig attempted to rescue the wage-fund doctrine. According to Taussig the amount wage-earners could earn at any one moment of time was fully determined by their consumption habits, the output available, and entrepreneurial willingness to produce further output. In our theory we substitute 'stock of capital available' for output.

UNIVERSITY OF BIRMINGHAM

NOTES ON THE EFFICIENCY OF LABOUR

By P. J. D. WILES

PART I. AN INTERNATIONAL COMPARISON

1. THIS paper arises from an attempt to throw light on the relative efficiency of labour in different countries. The original work of research was a voyage of inquiry among firms which have branches in Britain and some other country, it being supposed that they were in an excellent position to make this sort of comparison. The results of this inquiry are the nucleus of the paper. The author wishes to thank these firms, both their British and their foreign branches, for their hospitality and their patience under interrogation; also the sources of the subsidiary information collected. But he is more especially grateful to the National Institute of Economic and Social Research for providing the not inconsiderable funds, and for help and sympathy at every stage.

Part I, then, consists of a comparison of the efficiency of labour in Britain, Belgium, Sweden, and Switzerland; i.e., in four western and central European countries not greatly affected by the war. The date, unless otherwise stated, is the summer of 1948. 'British' means in fact English or Scottish: there are no Welsh or Northern Irish examples. The word 'labour' in this part does *not* include management, but means only manual labour. It cannot be too strongly emphasized that criticisms directed against the British manual labourer do not imply that British management is in some way better. On the contrary, comparisons with foreigners seem to be equally adverse to managers, and the only trouble is that the evidence for them is so very much less reliable. For there are no relevant statistics, and scarcely any witnesses with sufficient experience of masses of managers in more than one country. And even without these difficulties the weight, so to speak, of imponderables would be more than any evidence could support.

We distinguish very sharply between production per head, or labour's 'productivity', and labour's 'efficiency'. The latter is clearly but one among many factors affecting the former; clearly machine-tools contribute more to productivity than hard work. If the labour of one country is more 'efficient' than that of another it may still be less 'productive', because it is worse equipped. Raw productivity comparisons, such as those of Dr. Rostas, have quite other purposes than to tell us about labour's 'efficiency'. Only if the equipment, product, materials, and layout are identical can productivity comparisons be used for this purpose. Indeed in such cases they form the definition of efficiency, the same definition in fact as is used

in examinations, aptitude tests, and all practical measurement. By '*A* is more efficient than *B*', then, we mean that under identical conditions *A*'s productivity exceeds *B*'s, or, which is the same thing, that the management considers him a better worker, purely as a worker. Under widely different conditions, of course, *B* might be more efficient than *A*, but that seldom happens with human factors of production. Men are not highly specific, but can transfer their ability and interest from one job to another.

Labour efficiency seems to consist of three elements: willingness or manageability, the amount of physical effort put in, and skill. Skill is chiefly—in the four countries that concern us at least—a matter of education, and we have tried to select data that eliminate it. But to compare the other two items, which for our purposes may be lumped together as the *will to work*,[1] is to compare a part of the national character.

It used at one time to be a favourite theme of 'progressive' thinkers that you cannot scientifically generalize about national character differences. Now while it is true that biologists have found no pure races, and have exploded much nonsense about hereditary differences, certain of these latter are admitted to exist. Much more important, however, we are told, in the psychological field, are environmental differences, and we are asked to assign to this class many phenomena that popular ignorance has deemed hereditary. This is all that biologists have said; they have *not* told us that there are no national character differences—they have merely warned us against crude propaganda or folk-mythology and against the attribution of cultural differences to hereditary factors. Indeed it is perfectly clear that judgements of national character can be made. It is a fact of common observation that Italians are excitable, Spaniards proud, and Swiss bourgeois. Often indeed statistics demonstrate such generalizations. For many decades suicide rates have been high in central Europe, illegitimacy rates in Germany and Austria, and so on. It therefore needs no apology if an attempt be made to discover whether the Briton is more or less idle than the Swede, Swiss, or Belgian. The methods may be unscientific, but the posing of the question certainly is not.

It appears certain that, climate apart, there are no *racial* (i.e. hereditary) differences in the will to work, only *national* (i.e. environmental) ones.[2] It is unquestionable, for instance, that all immigrants work harder in the New World than they did in the Old. But it is doubtful if any particular race of immigrant shines most. To be sure, English labour used to be

[1] Though they usually go together, manageability and physical effort are really quite separate. American labour is certainly more manageable than British, but surely less willing to exert physical effort, at any rate of an unpleasant kind. Thus though our superiors as industrial workers Americans are inferior infantrymen.

[2] Cf. L. Ord, *Secrets of Industry*, pp. 53–54.

unpopular in Canada—advertisements offering jobs often contained the phrase 'no Englishman need apply'; but many Canadians are of English stock, so we may safely say that this only means that Englishmen are slower to change their tempo, or start from a lower tempo, than other Europeans. It may therefore be concluded that most of the factors influencing labour efficiency are cultural, not biological. But it does remain true, of course, that in hot climates coloured labour is better on the whole, and *vice versa*; to this extent biological factors certainly count.

When we venture outside the circle of white races the differences in the will to work become enormous, and have obvious commercial consequences. Africans were imported to pick cotton in U.S.A. because Red Indians would not do. Indians were imported to East Africa for the railways and plantations because negroes would not do. The middle classes in south-east Asia are very often Chinese because the natives are too idle, too stupid, too honest, or too feckless. Even among the white races Jews, Armenians, and Greeks occupy very special economic positions largely owing to their national characters.

Next as to the methods employed. The principal method was to visit firms carrying on production in Britain and one of the other three countries at the same time. These firms were then asked what the general opinion of management was as to the relative merits of the labour forces they employed, and whether this could be supported with statistics of P.M.H. for such jobs as were carried on with identical machinery, layout, materials, &c., in both places. Most often these statistics were not available, even for quite small subdivisions of processes, as there is always *some* difference between one productive set-up and another. However, such meagre statistics as became available are presented in Table II. Other indices of labour efficiency taken are: the length of shop and office hours, the percentage of absenteeism among miners, and the weight of bricks usually carried by a builder's labourer. The merits and demerits of these methods fall next to be discussed.

2. General difficulties appertaining to labour efficiency comparisons

i. *Ceteris* are never *paribus*. As we have seen, the prime condition for efficiency comparisons is a perfect similarity of circumstance. After ensuring that product, raw material, tools, and machinery are identical, we may still find factors vitiating the comparison, for instance:

(*a*) Age and sex of labour are not identical.

(*b*) The scale on which the process is carried on differs, with the result that there is less flow production and a higher proportion of skilled to unskilled labour in a small factory.

(c) The quality of managerial leadership may differ, particularly among the foremen.

(d) There may be a difference in the incentive effects of the wage-payment system.

(e) One works may be newer and less experienced than the other, or still be recovering from a war or other upset.

(f) The layout of the plant may be quite different. This is a highly important point often neglected.

(g) One small consolation: belt production and radical re-deployment of labour often leave actual machining processes on individual machines quite unchanged. So the times for these can be fairly compared between large, well-managed factories and primitive ones. In all cases, of course, setting-up time must be excluded.

(h) Many machines run at a constant speed which in no way reflects the operative's skill—textile cards and combs are very good instances of this. But a very fair idea of the relative efficiency can in such cases sometimes be got by simply comparing the number of men per machine and altogether neglecting output. Such comparisons have been used below as being of equal value with P.M.H. comparisons.

(i) But when this alternative method of measuring P.M.H. is used we must remember that management may be deliberately keeping P.M.H. down for what may be excellent reasons. For the cost relationships of labour to capital may be such as in country *A* to require high loom-utilization and low weaver-utilization, and vice versa in country *B*, even though warp, weft, loom, weaver, and cloth are in physical terms identical. In practice, of course, no such simple case arises; the cost relationships are merely one factor among many causing differences in the number of looms per operative, others being the likelihood of breakages, the thickness of weft on the pirn, the quality of cloth required, &c. Happily most of our statistical comparisons are drawn from the engineering industry, where many cases exist in which the speed of the machine is an excellent measure of P.M.H., as the ratio of one man one machine is unalterable.

ii. Are qualitative or quantitative judgements best? There is a widespread tendency to regard statistics as in some way more 'scientific' than facts which cannot be demonstrated by numbers. Whatever justification this attitude may generally have, it has none at all here. The statistics here presented are probably *less* reliable than the answer to the simple question, 'Do Belgian workers work harder than British?' This is because the only useful figures are those which give the labour requirement for absolutely identical processes in absolutely identical circumstances, and, as we have seen, these conditions are practically never fulfilled, whereas the opinion of a reasonable man can give us some sort of guide under only approximately similar conditions, which obtain fairly often.

iii. Dispersion about the average. There are, of course, far greater differences between the firms and individuals of one nation than between the averages of two nations. But there are probably also as great differences between regional averages within one nation, as between national averages. The point is elaborated below (iv (*c*)).

iv. Isolated comparisons though genuine enough in themselves may be

subject to systematic bias, and misrepresentative of the whole. For instance:

(*a*) It is possible for one country to take a certain industry more seriously than another. When a country specializes in an industry this means more than the mere fact that it produces a certain group of products on a large scale and exports them. It means that this industry has a good reputation in the country and attracts more than its 'ordinary' share of ability. Thus in Sweden the engineering industry attracts the best of both managers and craftsmen. The technical schools, the universities, and the government will all combine to favour this industry in various ways. The social status of workers in it will be higher than that of similar workers in other trades, thus attracting the best of them too.

(*b*) One works is situated in a district noted for its traditional skill, say a small engineering village in Sweden, while the other is in an area that has never provided this precise type of labour, say a London outskirt. Again and again managers in London spontaneously stated they could equal the parent foreign company's time if they were located in the north or midlands. It is, of course, true that industry much overrates the importance of traditional skill, as was many times shown in the war: if radical re-deployment of labour is necessary it is easiest done away from the traditional area. But where the craftsman is still supreme it does appear that traditional skill is very important.

(*c*) There can be serious regional differences in the will to work within one country. If then of two factories compared one is situated in an 'industrious' part of country *A*, the other in an 'idle' part of country *B*, the comparison is vitiated. Here again the Londoner comes off worst. There is universal agreement that he is more idle than British workmen from other parts, so comparisons between London and, say, Stockholm, operate unfairly to the disadvantage of the United Kingdom.

As to these possibilities, no evidence apart from hearsay is given here that there are regional differences in labour efficiency. The subject seems to be worthy of study, using the technique of questioning 'inter-regional' firms. Some work has been done on this in U.S.A., where the south is often alleged to be an 'idle' area. Evidence shows, however, that this is not necessarily the case.[1]

v. One must be careful with the output used as the numerator in the productivity fraction. The output of ticket collectors is tickets collected, not passenger miles, and so on.

vi. The Englishman dislikes the appearance of working more than work itself. Certain foreigners—Egyptians and Americans, for instance—are of very opposite temperament. The Englishman prefers to hurry, if at all, with dignity, and to hold back a part of his personality from the immediate task. He may be a better, because a more steady and continuous, less flashy worker than the foreigner, and it is thus very easy to underestimate the amount of work he is actually doing and its efficiency. Many foreigners probably make this mistake.[2]

[1] J. W. Markham, *American Economic Review*, March 1943; R. A. Lester, *Journal of Political Economy*, February 1946. The inferiority of southern English labour is as old as Marshall (*Principles*, bk. ii, ch. 3, § 3, note).

[2] Cf. A. Shadwell, *Industrial Efficiency* (2nd ed., 1920), pp. 372–3.

3. Difficulties peculiar to the study of international firms

i. Much the majority of those questioned belonged to management, not labour, and in many cases there was a pronounced anti-labour bias. But this operates in the disfavour of all nationalities impartially, and should not bias comparisons. That only management should be interviewed was inevitable, for it is mostly managers who travel; their opinion is also far less likely to be biased by nationalism or personal reasons than labour, and their capacity to generalize will naturally be greater owing to better education. Only where there has been migration can one get useful workmen's opinions; compare 4 below.

ii. Nationalism. On the whole this does not appear to play a very large part. Management in international firms is so intensely aware of the dangers of nationalism in the internal politics of the firm that it is scrupulously—and successfully—avoided. There was almost always substantial agreement between members of a single firm, and occasionally citizens of 'neutral' nations were present and expressed the same opinion.

iii. The management of an international firm is more likely to insist on high standards, and somewhat unusual ones perhaps from the point of view of one of the two nationalities it employs. It is likely to iron out national differences and make labour efficiency more similar than in the general case. By standardizing its hiring system it may select individuals not typical of the nation.

iv. Similarly the trades engaged in by international firms are unsheltered. Clearly labour will tend to be more efficient in these than elsewhere.

v. Another element of bias that could not be eliminated is that managers read the press and in a few cases may not have been giving their own opinions on matters within their own experience; they may have been unconsciously quoting such articles as 'the Carrot and the Stick'.[1]

vi. Another element of bias creeps in when one asks a manager to compare past labour efficiency with present. He will be strongly tempted to claim a decline, just as a working man will claim his standard of living has declined. Everyone is *laudator temporis acti*, everyone enhances his own worth by showing how much his difficulties have increased, everyone likes to grumble. Class feeling also makes a difference here: very conservative managers are bound to claim that labour worked better in the past.

Take one thing with another, the questioning of international firms is the best possible method of comparing labour efficiency. For one thing the expert is ready to hand. No man, not even an industrial consultant, let alone an economist, can really know very much about more than, say, three industries during his lifetime. In order to compare efficiency in two

[1] *The Economist*, 29 June 1946.

works one needs at the very minimum three years' experience of that industry. Yet by the method under consideration one can take expert opinions in a different industry every day. Of course the greater the questioner's technical knowledge the better, but his common sense and judgement of people are vastly more important. The second great advantage is that independent works are almost invariably incomparable. Only when they are under one direction is there even a chance—and then only a slender one—that the infinite possibilities of variety should be reduced to a manageable compass.[1]

4. Difficulties peculiar to the study of migrant labour

One might suppose that a perfect comparison of labour efficiency is possible where workers of various nationalities work side by side. But it is not fair to judge a nation by its emigrants. For usually they are the best and most enterprising individuals, or sometimes at the other extreme they are demoralized refugees, not possessing the requisite skill. In either case trade unionism is bound to be abnormally weak. Furthermore, the desire for money will be strong and the desire for leisure weak. There may also be a tendency to show off. Again the climate may differ significantly and of course every sort of psychological influence will disturb the comparison. General comparisons based on many instances over a long period of time may be well enough. It is, for instance, incontestable from this sort of evidence alone that Englishmen do not work so hard as Canadians or Americans: a multitude of witnesses[2] in all walks of life is practically unanimous on this. But more isolated comparisons are not of much use. Unfortunately there is little migration of labour between the four countries treated here.

5. Final caution

In rare cases the diligence of labour may have the effect of *lowering* P.M.H. For by willingness to work long hours a workman may prolong

[1] A striking and convincing demonstration of the inferiority of European to American labour, based entirely on this method, is given by L. C. Ord in *Politics and Poverty*, ch. 6.

[2] e.g. A. Shadwell, op. cit., pp. 373–4. Parts of this bear quotation: '. . . Workmen do work harder, and very much harder, in America; not in every case but taken all round. It is not a conclusion derived from limited observation only, but rests on the unanimous evidence of the most unimpeachable witnesses. . . . American factories and workshops swarm with English workmen, foremen, and managers. I have talked with many of them in different trades and different localities and they all said the same thing. . . . The workmen cannot explain though they admit the difference. I asked a (weaver) from Kidderminster. I said, "You not only have longer hours here, but you work much harder while you are at it." "Yes, that is so", he answered. "If you were asked to do half as much at home you would go out on strike." He laughed and admitted it. "How is it then?" He scratched his head and could not tell.' Cf. also L. C. Ord, *Secrets of Industry*, pp. 53–54. Personal contact with Americans will almost always yield corroborative evidence of this point, and the reports of the Anglo-American Productivity Council's teams, of which British trade unionists are usually members, appear to be unanimous in the matter.

his efforts beyond their proper usefulness. The only example here that I can think of is shopkeeping. Clearly on any reasonable definition of labour efficiency that of the shop assistant who works long hours is greater than that of his competitor who does not. Yet his P.M.H. will be lower, for customers will not buy much more from him *in toto*, but will merely spread their purchases over his longer hours. So this is a case where P.M.H. is not merely an unreliable guide to labour efficiency but positively points in the wrong direction. In shopkeeping the working week is the best labour efficiency index, although it tells us in fact nothing about skill, only diligence. The simple comparison of hours worked is in fact very illuminating, particularly where the individual is in control of the number of hours he works. To a certain extent the same is probably true of office workers. The hours of shops and offices are therefore included in this study. They are, of course, influenced by legislation, but this legislation itself is but a reflection of the people's attitude to work and consequently does not vitiate the comparison. A genuinely vitiating factor would intrude if in one of the countries compared the workers affected were seriously discontented with their standard of living. For instance, if all Belgian shopkeepers had greatly lost in real income during the war they might now all be keeping longer hours in order to earn more: whereas the Swedish shopkeeper, more content with his present income, would have no such incentive. But this case does not appear to have arisen.

6. The data from international firms

We now turn to the actual facts about labour efficiency. In this section are given the results of the inquiry into eighteen international firms during 1948.

(*a*) Table I on page 166 summarizes the answers to the question, 'Do you consider that in 1948 your foreign labour is more or less industrious than your British?'

(*b*) No firm, except No. 10 in Table I, thought the *pre-war comparison* would have put its branches in a different order. But many firms were rather vague about this subject.

(*c*) Table II on page 167 gives a statistical demonstration of (*a*).

(*d*) The degree of *skill* depends on local tradition and on training. It scarcely reflects—at any rate within the compass of western Europe—any hereditary differences. It means very little for our purposes when we discover that in some Swedish town woodworkers are more skilled than in the London area, or that an old-established firm in England finds difficulty in getting the requisite craftsmen in Brussels. We must be content with the general opinion that *ceteris paribus*—and I should not like to be pressed for too close a definition of that phrase in this context—the

TABLE I

Firm number	*Older established in (country)*	*Answers to questions*		
		Switzerland	*Sweden*	*Belgium*
1	Britain	..	..	More
2	Britain	..	..	More
3	Belgium, then Britain	('We are the same as in Belgium')	.. ..	More
4	Britain	..	..	No difference (see note i)
5	Sweden	..	? No difference	..
6	Switzerland	More	..	..
7	Switzerland	More	..	..
8	Sweden	..	More	('We are better than in Sweden')
9	Belgium	..	..	More
10	Sweden	..	(see note ii)	..
11	Switzerland	More	..	..
12	Britain	More	..	..
13	Sweden	..	More	..
14	Sweden	..	More	..
15	Belgium	..	..	More
16	Sweden	..	More	..
17	Britain	More	More	More (and also better than in Switzerland or Sweden)
18	Neither country	Less (see note iii)		

Notes:

i. This case is a firm enjoying a quite exceptionally good reputation as an employer in both countries. All the managers spoken to were English: they believed the difference was in the eye of the beholder, and that an unprejudiced observer would see little in it.

ii. This firm produced a contradiction. In Britain, where there is now an excellent piece-rate system, the Swedish manager considers he can beat Swedish times. In Sweden they do not believe him. Before the war Swedish times were better.

iii. The reason for preferring British labour is that it is more willing to work overtime and shifts. Otherwise no difference is seen. The British labour is mainly non-union, the Swiss is unionized.

Briton is quite as skilled as the Swede or the Swiss, and more so than the Belgian. Firm 17, who have a wide experience of the matter, put the Belgians first and the British last, but this is certainly not the ordinary view.

The comparisons given in (*a*) and (*c*) practically eliminate the factor

TABLE II

Foreign P.M.H. as percentage of British

Firm number	*Notes*	*P.M.H. relative*	*Foreign nationality of firm*
15	One process only	129	Belgian
18	Two identical *factories* (see note iv):		Swiss
	1947	91	
	first half 1948	83	
12	One process only	125	Swiss
9	Process *A* (see note i)	121	Belgian
	B	113	
	C	125	
	D	102	
	E	113	
8	Process *A* (see note ii)	141	Swedish
	B	160	
	C	142	
	D	158	
	E	140	
	F	162	
	G	157	
	H	164	
	J	163	
	K	181	
	L	133	

Notes:

i. In firm 9 the British branch is newly established and does not consider itself settled down. Scale is larger in Belgium, but there is no technical reason why this should matter. The Belgian figures are slightly underestimated, on the other hand, as they refer to a standard time which is normally exceeded. The British times are actual times.

ii. Firm 8 supplied the times allowed by the rate-setters, not the actual times achieved, in all cases. Sweden has longer runs in processes *A*, *B*, and *C*, and better machinery for the rest. But the British branch estimate that the Swedish advantage on that account is very slight for processes *A*, *B*, *C* and not much greater for the rest. It is not thought that the actual times would present a different picture.

iii. Firms 18, 12, and 15 supplied actual times only.

iv. It is most unfortunate that the only favourable comparison for Britain (that of firm 18) is the least reliable of a rather unreliable lot. There must, of course, be small differences between the factories, and a host of upsetting factors neglected. It was this firm that took the investigator least into its confidence.

skill by concentrating on semi-skilled operations. The statistical comparisons furnished by firm 9 contain an element of skill, however.

(*e*) *Restrictive trade-union practices*, in the experience of the firms visited are unknown in Belgium, practically unknown in Switzerland, rare in Sweden. But they are very commonly complained of in Britain. On the other hand, there is in all four countries a natural reluctance on the part of individuals to work overtime or shifts; the only difference here is that

trade-union opposition to these things is most marked in Britain, even going against the will of individual workers. (But on the higher levels the British trade-union movement is easily the most advanced and co-operative; there is nothing to compare with the T.U.C.'s productivity drive in any of the other three countries, a curious contrast with our sad position on the lower and more important levels of trade-union activity.)

(*f*) Nothing special emerges about *discipline, absenteeism, punctuality.* Afternoon and morning tea breaks are more common in Britain, and have a knack of prolonging themselves which is perhaps more pronounced than elsewhere. Our tea habit makes the most unfavourable impression on foreigners, even biasing their general picture of us. *Tidiness and orderliness* in the factory, in keeping gangways clear, putting tools away, not wasting material, &c., is of course most marked in Sweden, where it has probably been pushed beyond the point where negative returns set in. The Swiss have a high standard in this, the Belgians a low one. The British are a little lower still.

(*g*) It would be as well to note how far the various upsetting factors noted in sections 2 and 3 were eliminated in questioning these firms.

(i) Age and sex of labour. Sex was always ruled out, but age differences have not been allowed for at all. They would not count in the type of industry investigated. (ii) Scale of production has always been allowed for. (iii) The quality of the welfare services provided seldom differed very significantly within one firm. Where it did, national character must be taken into account: for Swedish workers insist on social services and other forms of communal provision that Belgians would reject with contumely. In this scale Britons are nearer to Swedes and Swiss to Belgians. There is also the tendency of firms situated in the country to provide more services than those in towns. It was not thought by any firm that variations in the quality of its welfare services were an important factor. (iv) The quality of managerial leadership could not be judged. But presumably it is most nearly even in international firms. Only one firm, No. 1, tries to impose a strong national bias and 'way of life' on its foreign (or at least its Belgian) branches. But this firm is neither British nor Belgian. For the rest national idiosyncrasies among workers and managers were not frowned upon. (v) No comparisons have been made between workers paid on widely different systems, with the possible exception of firm No. 10, already noted. (vi) Comparative newness and inexperience of the firm is indicated in the second column of Table I. (vii) It is not my impression that any source questioned was simply quoting the press and not his personal experience. But the fact that the investigator was British, and alleged interest on the subject in Britain as a reason for coming, may have caused people to tell him what they thought he wanted to hear: clearly no British investigator would come if it was not pretty generally suspected that British workers were the most idle. (viii) Finally, as has been mentioned, the will to work may vary between districts within a country. Industrial opinion attributes a lower than average will to work to south-east England, Wallonia, French Switzerland. I was not able to check this opinion in any way, but if we accept it the British branches of the following firms are in south-east England and therefore in an 'idle' area: 1, 3, 8, 9, 10, 14, 16, 17. Two of the firms are in Scotland, but to say which would reveal their names. All Swiss factories, except that of firm 18, are in German Switzerland,

and therefore in an 'industrious' area. 'They live to work, we work to live', say their French-speaking fellow citizens. Firm 9 in Belgium employs mainly Walloons, that is 'idle' people.

7. Hours of work

(*a*) We take first the 'standard' working week for manual workers in industry. This gives us some idea of the hours a nation thinks ought to be worked; it is the answer to the simple question, 'How long is your working week?' In other words, it is the norm or basis of calculation for wage rates. The actual number of hours worked is, of course, affected by the state of trade and is less satisfactory.

The figures for 1948 in the international firms quoted above are:

TABLE III

Britain	*Sweden*	*Switzerland*	*Belgium*
44	48	48	48

With exceptions in each country, mainly progressive firms with shorter working weeks.

(*b*) Shop opening times, 1948. Small family shops only.

TABLE IV

Britain:	9–5 or 6 with Sundays off and one half-day a week.
Sweden:	8 or 9–6. Sundays off, except that provision merchants are open for 1 or 1½ hours. Many shops shut at 3 on Saturdays.
Switzerland:	7.30–6.30, Saturdays 7.30–5 or 6, Sundays off.
Belgium:	*any time–any time.* There are no regulations for shop hours in this country, and closing times vary between 6 and 12. Sundays are off.

These figures are very approximate. There are numerous local exceptions. For instance in some English towns there is one late night a week for the benefit of factory workers; in Lucerne longer hours are permitted during the tourist season, &c. In each country certain classes of shop have longer hours and certain Sunday openings are permitted. Again, in each country the salaried workers of larger shops do a 48-hour week (in Britain about 41 hours). Breaches of the regulations are frequent. In Belgium the hours worked depend partly on the state of trade. Recently (1948) they have lengthened, as trade is worse.

Shop hours worked may be longer or shorter than the actual working day of a shop assistant. He may take time off or do shifts. He may have to turn up before opening or stay until after closing. Nevertheless Belgium clearly works the longest hours and Britain the shortest.

(*c*) Office hours, 1948. As in (*a*), these are 'standard' hours. Although not affected by the state of trade, they will be subject to other exceptions. Progressive firms in all countries work fewer hours, and there is a tendency

to work fewer hours in capital cities.[1] The especially short hours of London, however, are partly due to the uniquely long journey to work of the London bureaucrat. If we count his travel-time the latter is a distinctly hard worked man. The figures are:

TABLE V

Britain	*Sweden*	*Switzerland*	*Belgium*
40	44	44	44

In Belgian offices Saturday work is not uncommon still. A business man may expect his telephone to ring on Saturday morning.

8. Bricklaying

It might be thought—and it was often suggested to me by businessmen in other industries—that *bricklaying* was a perfect field for labour-efficiency comparisons. It certainly is not. On closer inspection the complications and difficulties in this field are overwhelming. They include: the proportion of assistants to bricklayers; the quality of the mortar; the quality of the work (e.g. how carefully a brick must be pointed); size and shape of brick; whether wages are for piece work or time work (in Zürich piece work has been known to *double* output); type of wall (e.g. how many windows and corners, how many bricks thick, if there is a space in the middle how it is dealt with); and the type of the wall in turn is governed by the type of construction considered typical (e.g. in Sweden blocks of flats, in the other three countries small houses; even the typical civil engineering constructions are often widely different). Above all, and in itself enough to choke off the researcher, there is the incredible variety of answers received (e.g. in Brussels figures varied between 600 and 1,050 bricks per 8 hours; regional differences are also marked). Nevertheless there is a very general opinion that British bricklayers do less work than their foreign counterparts, an opinion so unanimous that weight may properly be attached to it.

There is, however, *the weight of bricks normally carried on a man's back.* This is less open to dispute. In Stockholm the bricks are carried by means of a chain passed round a pile of them; the chain has rope ends which the workman grips. In Zürich they are carried on a little wooden framework which fits like a rucksack. In England the hod is used. In Belgium bricks are seldom carried on a man's back. The figures are (kilos per load, 1947–8):

TABLE VI

Britain (Midlands)	*Stockholm*	*Zürich*	*Belgium*
30–40	85	50	..

[1] A phrase covering both Berne and Zürich.

It has been objected that these figures do not allow for rests in between loads, which may vary inversely with weight of load. There are no data for this, as a workman never carries bricks for long; but it is suggested that the objection is at most not likely wholly to outweigh the superficial conclusion that the heavier the load the greater the performance. The amazing Swedish figure has been carefully checked.

9. Coal mining

Labour-productivity comparisons are easily obtained in this industry but shed even less light than usual on labour efficiency. For not only does equipment vary as in any other sphere, but also the variations in the factor 'land' are of quite unwonted importance. However, we are lucky in another way: mining is so unpleasant that it gives rise to very high *absenteeism*, and the individual effort of the worker is so important that this absenteeism is recorded and studied. It is moreover a very fair indication of the will to work in normal conditions. For while it tells us nothing directly about ca'-canny and idleness while at work it can hardly fail to be positively correlated with these latter; besides which, regularity of attendance is itself a part of the will to work.

The Belgian figures below are directly copied from the original source. The British figures have had to be doctored, as absenteeism is given as a percentage, not of the gross number of shifts that might have been worked but of the net total, after deducting time lost through holidays, accidents, &c. This is quite logical, and would not be a serious matter if time lost through these other causes were only given as such; but it is given in the form of tonnage lost instead of time lost, and this tonnage has somehow to be reconverted into time. This is no easy matter, as the pit staff who estimate tonnage lost through these causes do so on principles known only to themselves, and do not employ, indeed rightly do not employ, fixed conventional factors. There is not space here to describe the arithmetic involved, but it should be said that a satisfactory check is available, which shows that the figures cannot understate the British position, but may overstate it by 4 per cent. (for instance, total absenteeism may be 9·9 per cent., not 10·3 per cent.).

The figures are given in Table VII (page 172).

Many comments on and qualifications of Table VII are necessary. The Belgian mines are not nationalized, but in more important respects resemble the British very closely. There is a Coal Charges Equalization Account as in Britain and strict government control; productivity has declined catastrophically since before the war, and absenteeism has risen; P.A.Y.E. affects the will to work; there is, or was, a coal shortage. One great difference, entirely to the Belgian credit, is the large number of

TABLE VII

Percentage of shifts lost to gross total of possible shifts
(surface and underground workers together)

Belgium 1946			*Britain July 1947–June 1948*	
Strikes	0·68		0·5	Disputes
Technical reasons	0·07			
Injuries	1·18	9·72	5·2 (0·3	Accidents
Illness	7·75		4·9)	Involuntary absenteeism
Justified absences	0·72			
Unjustified absences	4·52		5·4	Voluntary absenteeism
Paid holidays	1·54			
Local fêtes	0·25	1·94	4·0	Recognized holidays
Funerals	0·15			
Total	16·86		15·1	Total
Length of working week (hours)	48		41	Length of working week (hours)

Sources: A. Verschueren in *Industrie*, organ of the Fédération des Industries Belges, Sept.–Dec. 1947; Ministry of Fuel and Power, *Statistical Digests* for 1943, 1947, and 1948.

foreign workers; 18 per cent. of free workers in 1946 were foreigners, and separate figures are not available for them. But this fact hardly makes the data unreliable, if we may judge by the absenteeism of the prisoners-of-war employed (not included above); this closely resembles that of free workers. Some time after 1946 the Belgian miner obtained a so-called 'miners' charter', a tangible consolation for not being nationalized in the shape of pensions, special sickness rights, &c.[1] The British figures come *after* the equivalent events in this country, i.e. after the five-day week and nationalization. As to the figures themselves, the introduction of the British five-day week brought about a large purely statistical drop in absenteeism, but in November 1947 an agreement was reached to work extra shifts, or in certain mines extra hours per shift, and this must tend to raise absenteeism. The figure of 41 hours a week refers to the period after November. Matters of definition should not be too closely pressed in regard to the various reasons for absence, and in many respects the total figure is the most reliable. For instance, the Belgian figure for illness is grossly inflated; for the great social revolution of national health insurance predates 1946, and all political parties admit it has been abused. We are confirmed in this suspicion when we read that 'illnesses' are higher on Mondays and Saturdays than on other days and twice as high as before the war.[2] Of

[1] The absenteeism figures for 1948 were, however, almost identical with those of 1946.

[2] Again, in an 'important steel works in Charleroi' in the month when national health insurance was introduced the average percentage of illness rose sharply to more than double its previous level, and has remained there for more than two years! The same effect is probably now to be seen in Britain (*Manchester Guardian*, 5 August 1949; *The Economist*, 29 October 1949, p. 941).

course, a certain number of 'unjustified presences' must have been put in before health insurance by those who came to work when they should have been in bed; but these surely cannot account for the whole increase. The Belgian strike figures exclude general strikes, and the British ones include Grimethorpe.

It may be deduced from these data that Belgian miners work harder than British. For the Belgians have a much longer working week and fewer holidays, and this outweighs the fact that their absenteeism, taking into account the large part of it that is certainly included under illness, is significantly greater than the British. This deduction is roughly confirmed by the following consideration: before the five-day week in Britain hours were about 110 per cent. of their subsequent level, but both voluntary and involuntary absenteeism were 150 per cent. Absenteeism thus exceeded the Belgian level of 1946 while hours were appreciably short of it.

10. Miscellaneous comparisons of labour efficiency

(*a*) All British families living in Belgium agree that *charwomen* work harder and longer for less in that country. They are also more easy to manage!

(*b*) Again and again, and spontaneously, it was stated that Antwerp *dockers* work harder than London dockers. This is evidently a fact of much notoriety. A very large number of shipowners and crews are in a position to make this observation. It has unfortunately proved impossible to corroborate it statistically.

(*c*) It is a very common practice for a Belgian worker to take extra *odd jobs* in the evening, often at black-market rates. No statistics exist for this, but it is undoubtedly commoner than in the other three countries, where after-hours work is generally confined to the garden and the home. The Belgian occupies himself in these ways too, but also in cafés, garages, and minor building operations. The phenomenon is, of course, due to the low level of real wages in Belgium, and has little to recommend it. But it still shows a decidedly superior will to work.

11. What conclusions, then, may we draw from this long comparison? It seems, first, safe to say that the *will to work* is strongest in Belgium and weakest in England. Of the intermediate countries perhaps Switzerland beats Sweden. But if we ask about the *efficiency* of labour as a whole, that is if we include skill as well, the answer is less clear. We have in that case no reason to promote the British from bottom place, but may well wish to demote the Belgians to an equality with the rest.

The most interesting question that arises is, without doubt, 'How far do differences in labour efficiency affect P.M.H.?' The answer of Table II is: considerably. But this table must be treated with reserve, and that not

only for its inaccuracy. It is well known that differences between individual workers, or small groups of them, are enormous, but we are here handling whole nations. Statistical comparisons are only available in processes where the effort of the worker really has some effect on his output. But in many trades, such as shopkeeping, the correlation is probably inverse; in still more, such as automobile assembly, the machine determines the worker's effort without giving him any choice; and in an even greater number, such as most textile operations, the machine's output is practically independent of the worker's effort. So whereas in certain industries, notably in engineering and coal-mining, labour efficiency is an important determinant of P.M.H., it is not so when all industry is taken together.

But that is in part because we are dealing with north-western or central European nations; we have been confined to a region fundamentally similar in race, culture, history, even climate. We have to move outside this little circle of nations before such factors acquire real importance. The differences between coloured peoples quoted in section 1 overwhelmingly influence the P.M.H. comparison, and the difference between U.S.A. and Britain is probably also significant in this sense. I met one case of a British firm with an American subsidiary where under identical conditions American productivity had been double the British, and for a long time. Again labour efficiency, or at any rate the will to work, must be more important for P.M.H. in primitive than in up-to-date economies, and in agriculture than in industry. The advance of mechanization and automatism render it a matter of less concern.

As to the importance of P.M.H. itself, we have no space to consider it here; but it must be borne in mind that it is a most equivocal and dangerous concept. Nor have we space to speculate on the causes of differing labour efficiency, which would of course be as much religious, social, and political as economic. Our task was humbler: to discuss the methodology and present a few facts.

PART II. A DECLINE IN THE WILL TO WORK?

12. The nature of the evidence

It would appear, then, that Britons work less hard than some foreigners. But it may also be maintained that there has been a secular decline in the will to work in this country, among both managers and workers. (We include the managers from now on.) This decline is really well known to exist. It achieves many passing references in newspaper articles and conversation, as if it were an accepted fact. The increase in the will to work at the beginning of the Industrial Revolution has been described by Sombart, Weber, Tawney, and others. It is academically respectable.

But the subsequent decline has never to my knowledge been systematically treated. What evidence in fact exists for it? Perhaps it is so obvious as not to require demonstration. It is certainly most difficult to demonstrate. Little of the evidence is really satisfactory, but I list what has occurred to me.

(*a*) The mere shortening of work hours, certainly a secular process, could be dismissed as due to rising income; man always wished to do less work and now at last he can afford to, but his attitude to work need not have changed. Nevertheless it is obvious that once we are used to shorter hours we are unwilling to go back to longer even on better terms. In the period after Dunkirk workers wore themselves out with a working week that would not have seemed over long to Lord Shaftesbury.

(*b*) The lightening of the actual tasks performed is open to precisely the same comments.

(*c*) The drift into white-collar jobs is similar again. Originally it will be a question of taking the sort of job one always wanted and at last finds open. But thereafter the process is irreversible. The soft job spoils one's will to do harder work.

(*d*) Then there is the drift out of hard, dirty, and menial jobs, while remaining within the field of manual labour—yet another similar case.[1] This phenomenon is common to many countries; in Britain and Belgium it is seen in the mines, in Switzerland in the lower grades of the hotel industry. The universal drift from the land (particularly marked among our four countries in Sweden) is probably another instance. In Britain again there are shortages of recruits, foundry workers, and housemaids, and in Sweden of housemaids. Miners, however, although their will to work has greatly declined, are in this respect a special case. There has always been extreme unwillingness to go down the mines, before, during, and after the Industrial Revolution. The number of labourers can only be kept up by force, or by their own exceptional fertility, or by unemployment in other trades. In the Western world all three factors are now inoperative, and the result is very plain. We cannot therefore take the drift from the mines as unqualified evidence for a fall in the will to work.[2]

13. The views of certain observers

Certain observers may be quoted who have in the past maintained the thesis of a decline:

(*a*) The Royal Commission on Agriculture (1894–6), Final Report, § 307, says:

'It is only fair to state that there were several witnesses who would not admit that

[1] Cf. *Report of Royal Commission on Population* (1949) (Cmd. 7695), §§ 326–7.
[2] Cf. I. Redford, *Labour Migration in England*, pp. 48–51.

the labourers of the present day in their districts were at all inferior to those of former times; but a general opinion exists among farmers that less work is done during a given time than formerly.'

The caveat of § 3 (vi) is relevant here: it was only human nature that farmers should make this complaint, even if it was untrue.

(*b*) But then there is this interview, quoted with obvious approval and agreement by a Fabian:

'On this great farm the piece-work principle was in force. "So if a man wastes his time he wastes what is his own", said my informant. The scale of pay was high for the district. "With these wages the men save, I suppose?" I said. "No, never. It goes as it comes. The men who get most don't live more comfortably than the others." "Do they take much interest in their work?" "Not the very slightest. If it were not for the piece-work plan we might as well give up." "Are the men who are now in their prime as skilled in their work as the old men used to be?" "There is no comparison." He referred to an old laborer who possessed nine arts. I will count them up. Hedging and ditching (in two varieties), dry fence making, rick building, thatching, hurdle making, sheep-cage making, mowing, brewing. "You have no laborer who can do the same now?" "No, not one of them."'
(Lieut.-Col. D. C. Pedder, *The Secret of Rural Depopulation*, Fabian Society, 1904.)

Neither of these authorities offers any explanation of the decline. During the previous 50 years the condition of the agricultural labourer had definitely improved, notwithstanding the agricultural depression. Lieut.-Col. Pedder indeed draws a convincing and horrifying picture of the social oppression of the squirearchy in the English country-side, but makes no claim that it had been getting worse—nor indeed could he, for it was clearly getting better.

(*c*) But an explanation is offered by the Royal Commission on Labour of 1894:

'The efficiency of the labourers at the present time is, generally, but not universally, said to be less than it was in past days, and the result is attributed to the migration of the more active and intelligent labourers. Allowing for the natural habit of depreciating the present and exalting the past, it seems reasonable to suppose that if the class of agricultural labourers is continually drained of its best and most promising youths it must deteriorate in character.' (Fifth and final report, section on the agricultural labourer, para. 26. Cf. also paras. 91, 130, 194.)

If it were merely a question of skill the drift from the land might well be the sole cause, since it might well select the most intelligent. But it is much less clear that it would select the most industrious, and we have also a decline in sheer industry to account for.

(*d*) Arthur Shadwell (op. cit., p. 23) sums up his experience of comparing U.S.A., Germany, and Britain as follows:

'Wherein (the English) fail is in the application of their powers, which have been to a great extent allowed to fall into disuse. . . . In both (Germany and U.S.A.) I have met with a pretty general tendency to regard England . . . as a spent force . . . The English still possess the energy and capacity which distinguished the nation of old, but have for some time past directed both into other channels.' [These channels are later stated to be gambling and sports (p. 653)]: 'The once enterprising manufacturer

has grown slack, he has let the business take care of itself, while he is shooting grouse or yachting in the Mediterranean. That is *his* business. The once unequalled workman has adopted the motto "Get as much and do as little as possible"; *his* business is football or betting. Each blames the other.' (The whole of pp. 651–65 are relevant.)

Mr. Shadwell was Industrial Correspondent of *The Times*. He travelled much in U.S.A. and Germany visiting factories at the beginning of the twentieth century. In these gloomy passages he appears to have forgotten the decline of drunkenness, which is the obverse of the rise of betting and vicarious sport.

(*e*) The Communist party was of course a very small minority movement in 1923, and its view of the working class both distant and distorted. But for what it is worth the *Labour Monthly*[1] thus described in April of that year the Revolutionary Trade Union Engineer;

'He is a man of superior skill to his predecessor of a generation ago, but, unlike him, he is contemptuous of any pride or delight in the exercise of his skill. He has no intention of placing his full capacities at his employer's service; he does the work allotted to him, mechanically, but with consummate ease, with his mind all the time upon other things. The basic principle of his everyday thought is the problem of getting rid of his capitalist employer; getting him out of the workshop, once and for all. . . . Higher wages, improved conditions, are all very well in their way, but amount only to a little more gilt on his chains.'

(*f*) Many contemporary foreign witnesses of the early nineteenth century British spoke in extravagant terms of their will to work. To quote them today is to raise a smile. Foreigners would definitely not speak of us in these terms today, and it seems fairly clear that we have changed, not they. We may then take their astonishment at our industriousness as evidence of a subsequent decline in it.

The building of foreign railways by English contractors afforded many opportunities for comparing British and foreign will to work in the nineteenth century. The British were accounted superior, but not invariably so. The following passages are culled from Sir Arthur Help's *Life of Thomas Brassey* (7th ed., 1888):

One of Mr. Brassey's timekeepers says to the author: 'I think as fine a spectacle as any man could witness, who is accustomed to look at work, is to see a cutting in full operation, with about 20 wagons being filled, every man at his post, and every man with his shirt open, working in the heat of the day, the gangers looking about, and everything going like clockwork. Such an exhibition of physical power attracted many French gentlemen, who came on to the cuttings at Paris and Rouen, and looking at these English workmen with astonishment, said "Mon Dieu! les Anglais, comme ils travaillent!" Another thing that called forth remark, was the complete silence that prevailed among the men. It was a fine sight to see the Englishmen that were there, with their muscular arms and hands hairy and brown.' (pp. 38–39.)

Mr. Ballard says that 'There are two men to a wagon. If the wagon goes out 14 times, each man has to fill 7 wagons in the course of a day. Each wagon contains 2¼ cubic yards. The result is, that each man has to lift nearly 20 tons of weight of

[1] I am indebted for this quotation to Mr. K. Knowles.

earth on a shovel over his head into a wagon. The height of the lifting is about 6 feet. This is taking it at 14 sets a day; but the navvies sometimes contrive to get through about 16 sets, and there are some men who will accomplish that astonishing quantity of work by 3 or 4 o'clock in the afternoon—a result, I believe, which is not nearly equalled by the workmen of any other country in the world.' (pp. 41–42.)

Mr. Hawkshaw says, speaking on the relative value of unskilled labour in different countries: 'I have arrived at the conclusion that its cost is much the same in all ... though an English labourer will do a larger amount of work than a Creole or Hindoo, yet you have to pay them proportionately higher wages. Dutch labourers are, I think, as good as English, or nearly so; and Russian workmen are docile and easily taught, and readily adopt every method shown to them to be better than their own.' (pp. 50–51.)

But Mr. Jones, one of Brassey's agents, says: 'For cutting rock, the right man is a Piedmontese. He will do the work cheaper than an English miner, He is hardy, vigorous, and a stout mountaineer; he lives well, and his muscular development is good.' (p. 46.)

It must be remembered in qualification of all this that British navvies were for obvious reasons more skilled. Also all the sources quoted are English, and doubtless nationalistic. Also the navvies, who came without their families, can have had little leisure preference, and every reason to show off.

(*g*) We have seen that the will to work is not so important in mechanized industries. This was already true of the textile industry in 1824 (Select Committee on Artizans and Machinery, 3rd Report, Mr. Alexander's evidence):

'A great number of them [the English artisans smuggled out to France] are better workmen; but there are many inferior to the French workmen ... I have seen an Englishman, at 10 or 12 francs, perform more work in 12 hours' time than a Frenchman in the same time; but I have also seen some Englishmen paid 10 or 12 francs a day, and they did not do more than the Frenchman, who received but 5 or 6 francs.' (p. 106.)

This passage then is included for honesty's sake, as contrary evidence. It becomes even stronger contrary evidence when we remember that the smuggled artisans were the best men—their French employers would not go to such expense for inferior men (Select Committee, *passim*).

(*h*) But on the side of a decline in the will to work we may also use R. W. Emerson as a witness. After his visit to England in 1847 he wrote (*English Traits*, Macmillan's edition, 1884):

'They have more constitutional energy than any other people.... The French say that Englishmen in the street always walk straight before them, like mad dogs.' (pp. 56–57.)

'The ambition to create value evokes every kind of ability, government becomes a kind of manufacturing corporation, and every house a mill. The headlong bias to utility will let no talent lie in a napkin,—if possible, will teach spiders to weave silk stockings. An Englishman, while he eats and drinks no more, or not much more than another man, labours three times as many hours in the course of a year, as any other European; or, his life as a workman is three lives. He works fast. Everything in England is at a quick pace.' (p. 128.)

Emerson gives the general impression of a careless witness. For instance, he does not here bother to explain, what is clear from the context, that he is speaking only of the upper and middle classes. But who today would find it in him to write thus of our upper and middle classes? The evidence of our senses surely tells us that there has been a decline here.

(*i*) Again there is J. B. Say:

"The English nation in general, apart from these favoured of fortune, is forced to incessant toil; it cannot relax. You don't see professional idlers in England; people with an unoccupied air, who look about them, are commented on. There are no cafés filled with people doing nothing, from morning to night, and the pavements are deserted every day but Sunday; everybody who uses them runs along absorbed in his business. Those who relax for a moment in their work are instantly ruined." (*De l'Angleterre et des Anglais*, ed. Arthus Bertrand, 1815, pp. 19–20).

Say had just returned from a visit to England, and his object was to explain to his countrymen what had happened there during the Napoleonic wars. Many of his observations fail to inspire confidence: for instance, this superior industry of the English he says is due to the high cost of living, which is due to taxation.

14. Changes in social custom

Certain changes in social custom, it could be argued, indicate a growth of general idleness or 'softness', though we must be careful that they do not merely indicate a more advanced culture or greater humaneness. Boxers no longer use their bare hands but gloves. Dances are less vigorous —the more violent American dances have hardly caught on over here. Manners are less formal and hence require less effort. The birth-rate has fallen, and that probably for more reasons than the mere improvement in contraceptive technique: the large family simply is not wanted so much as before.

15. *Flow production*, it must be remembered, masks the decline in the will to work by leaving the worker no choice. Of old confined to the textile industries, it has spread continually, leaving idleness less chance to show itself. This is also the probable explanation of the fact that there are fewer restrictive trade-union practices in the industry than there used to be[1]—a fact otherwise counting strongly against any decline in the will to work: it is mechanization and standardization that have enfeebled the craft unions and afford less opportunity for this kind of thing.

16. Conclusion

We appear then to be faced with a secular decline in the will to work, which is doubtless not confined to this country but a universal 'disease' of industrialization. We will not speculate upon its causes here, except to

[1] Hilton, J., and others, *Are Trade Unions Obstructive?* passim.

express doubt that socialism, capitalism, or unemployment are greatly responsible. Rather would I attribute it to something more fundamental: progress itself. It is not simply that technical progress makes shorter hours of work possible: it has many, many other effects upon work. We may sum them all up by saying there is a rising *standard of living while at work*: a demand not only for shorter hours but for less heavy work, less dirty work, less discipline, more say in the management, more safety regulations, more breaks, more attractive surroundings, &c. Many of these demands may be as important as the simple demand for more leisure. They are certainly more justified, once the working week has been reduced to a certain point, but they have also greater dangers. On the whole the 'standard of living while at work' is higher in Britain than in the other three countries here considered: one might even say that it was higher than in U.S.A. In Britain it is far in advance of the degree of productivity, and from this unbalance, unknown in other countries, stem many of our present griefs.

The main elements for us of our too high 'standard of living while at work' are these:

restrictive trade-union practices much exceeding those of other countries;
a working week shorter than in most other countries;
a flight from basic industry, entailing an unsupportably heavy superstructure of tertiary industry;
a loss of pleasure in work well done;
increasing skill and technical education;
more (spontaneous) industrial democracy than in other countries (this may seem surprising, but it was the universal opinion among the international firms I visited: the British workman simply will not take impersonal orders like the foreigner, but insists on a man-to-man discussion).

Finally, what is due to progress itself may not be a bad thing anyway. It is, of course, obvious that while there are times and places—for instance, in our coal-mining industry today—in which a greater will to work would be an enormous benefit, civilization not only causes this decline but partly consists in it. Nor, with increasing mechanization, need the effect on the standard of living be very great; for flow production, as we have seen, makes light of a low will to work. To study the phenomenon is not to apportion praise or blame; nor to claim for it universal importance; and least of all to deny the virtues of idleness.

NEW COLLEGE,
OXFORD

BUSINESS SAVINGS AND EMPLOYMENT

By F. W. C. BLOM

I

In discussions on Keynesian style of saving and the saving-investment relation it has, until lately, been usual to treat 'business savings' as a constituent part of the 'personal savings' of shareholders. This is unsatisfactory because it obscures the importance of the supply of venture-capital as a strategic factor in the policy of firms. Whereas all business savings are venture-capital, only a small part of personal savings takes this form; and the redundant savings, which characterized the pre-war depression, consisted, in my view, not of venture-capital, but of 'rentiers' capital'.

It need scarcely be said that the financial structure of firms, especially the rate at which indebtedness is changing, exerts a great influence on their propensity to invest or disinvest. Quite apart from the comparatively unimportant influence of the interest-charges, over-indebtedness enhances unfavourable risks and reduces favourable chances. Therefore entrepreneurs are rather debt-shy and will tend to restrict their physical investments to an amount not in excess of a 'safe' proportion of their available venture capital. This familiar principle of sound business finance has been introduced to business-cycle theory by Kalecki and Steindl as the principle of 'increasing marginal risk' and, in the United States, by Albert G. Hart as the principle of 'the linkage of risks' through indebtedness.

Since 1929 a scarcity of venture-capital has become more and more apparent all over the Western world. For small firms it has always been difficult to obtain such capital from savers, but during the second quarter of the twentieth century even larger firms encountered some disinclination on the part of savers to hold it. Its relative scarcity can be attributed in part to the social changes, largely promoted by taxation, in the direction of greater equality in the distribution of net income and wealth as between individuals; the resources at the disposal of those rich capitalists who are mentally and financially equipped for investment in equities have been reduced, and there has been a diversion of savings to insurance companies, social security funds, and the like. Moreover, profit expectations were poor during the inter-war years; and when profits were earned, they were subjected to far heavier taxation than in the nineteenth century.

Seen from the point of view of the individual firm there is not infrequently a serious shortage of venture-capital on the capital market, even at times when a soundly financed firm can avail itself of a reasonably ample supply of loan capital. If the firm is not unsoundly financed and seeks to implement an investment plan, the supply of the additional

venture-capital is the bottleneck; it will therefore tend to supplement its venture-capital by the formation of business savings. On the other hand, if a firm is unsoundly financed and feels itself compelled to improve its financial structure by reducing its indebtedness-ratio, it can choose between disinvestment or profit-retention. No doubt, if practicable, the latter alternative is preferable. Fast disinvestment causes capital losses and disorganizes the business; slow disinvestment means no renewal of amortisized equipment and gradual starvation. Thus it would seem that both the urge to invest and the urge to redeem debt stimulate the retention of profits.

All savings offered in the form of venture-capital will be very easily absorbed by firms, but they will be ready to borrow other forms only up to a certain proportion of their available venture-capital. If, for example, the supply of capital from savers is such on the long run that only 30 per cent. of the total supply of savings is available as venture-capital, but firms are not inclined to borrow funds in excess of their own resources, then they will not absorb the remaining 40 per cent. of savings. That means that these savings will be left uninvested and will thereby depress national income and employment. Thus it may happen that entrepreneurs have profitable investment-plans, which they cannot execute because they lack the 50 per cent. venture-capital necessary for financing such an expansion, whilst at the same time rentiers' capital is relatively plentiful. This was, in my view, a characteristic of the pre-war depression: entrepreneurs were complaining about the scarcity of capital and the low quotations of their shares, and savers were complaining about the high prices of bonds, the low rate of interest, and the insufficient demand for rentiers' capital. These circumstances mean stagnation, and many authors have attributed such stagnation to 'over-saving' or 'under-consumption'. This is not necessarily the correct explanation. 'Bad-quality-saving' may also produce deflation.

In my opinion, a trend towards stagnation owing to an increased discrepancy between the risk-shyness of savers and the debt-shyness of firms made itself felt after 1929, and in several countries still earlier. The 'negative trend' due to that disequilibrium was the undercurrent of the depression of the thirties.

II

If both the risk-shyness of savers and the debt-shyness of entrepreneurs were unchanging and were such that a relative scarcity of venture-capital resulted, the voluntary conversion of all savings into investments would be impossible and business activity would be subject to a straight downward trend. But neither risk-shyness nor debt-shyness is stable. Life is

full of irregular happenings; circumstances may temporarily reduce the risk-shyness of savers and at the same time also reduce the debt-shyness of entrepreneurs, or may, on the other hand, unduly aggravate for a time both risk-shyness and debt-shyness. These variations in risk-shyness and in debt-shyness are, I think, an important feature of business fluctuations, and I suspect that their importance has not yet been fully appreciated.

The easiest way to illustrate the importance of this factor, say, during a downswing is by constructing models showing the behaviour of individual savers and individual firms throughout the 'cycle'. It is, however, so evident that the risk-shyness of savers fluctuates during the course of a 'cycle'—the shift from the supply of rentiers' capital to the supply of venture-capital in times of expanding business activity and the reverse shift in times of contraction and stagnation—that it is quite superfluous to demonstrate the influence on business fluctuations of the structure of capital-*supply*. In our following model of the behaviour of the individual firm we shall, therefore, concentrate attention on the effect of changes in the composition of the *demand* for capital from business enterprises; indeed, we shall even assume that the risk-shyness of savers is completely stable, which means that we understate the forces contributing to cyclical movements.

The debts of a firm are a well-defined quantity; their amount, at least, is fixed in money. So are the interest-charges, and, unless the firm nears bankruptcy, the terms of redemption are also fixed. The venture-capital of a firm, however, is somewhat vague and fluctuating. Theoretically its venture-capital is its capitalized earning capacity minus its debts; and therefore the valuation of an entrepreneur's venture-capital will fluctuate with his earning-prospects. In our model we assume that in the eyes of the entrepreneur his venture-capital is evaluated by reference to the average of his recent earnings and the earnings anticipated in the near future, and from this figure his total liabilities have to be subtracted. Therefore, in the eyes of the entrepreneur his venture-capital 'grows' in favourable years and 'shrinks' in bad years; and if his debts remain the same amount, his indebtedness-ratio fluctuates in the reverse direction. During favourable years his indebtedness-ratio appears low, and during bad years the same debts mean a higher indebtedness-ratio for the same firm. We start our model of an individual firm's behaviour at the end of a depression, and assume an indebtedness-ratio that is not too high in the entrepreneur's judgement.

Upturn. Some outside influence may occur to improve the earning-prospects of a firm. Whether it is a new invention or a change of general business conditions is immaterial for our model. The results are the same: (*a*) the deterrents against borrowing more money are weakened, as the

existing liabilities of the firm become less oppressive as compared with its improved earning-prospects (i.e. the growing venture-capital); and at the same time, (*b*) the incentives for the entrepreneur to invest in extensions of his business are increased. These two influences together will cause the entrepreneur to borrow more rentiers' capital and to invest the proceeds in expansion of his business. If several entrepreneurs do so at the same time, much rentiers' capital will be drawn into firms and be spent by them in a process of business expansion. As long as the velocity of expansion increases, the aggregate earnings of firms will continue to rise and that will further reduce their existing indebtedness-ratio and weaken their reluctance to contract additional debts.

End of the upturn. This movement of general expansion must evidently come to a stop somewhere. For a multitude of reasons earnings-prospects cannot continue to increase indefinitely; and as soon as this occurs entrepreneurs' estimates of their venture-capital (as measured by recent, actual, and near-prospective earnings) will no longer 'grow' and therefore their existing indebtedness will no longer 'shrink'. From then onwards their existing debts will deter additional borrowing and thus deter further expenditure on business expansion.

Downturn. Entrepreneurs may now begin to suspect that their debts are unsound as compared with a reduced earning-capacity and may therefore try to reduce their indebtedness as fast as possible before it is too late to protect their firms' liquidity. If it is assumed that an issue of shares is impossible—and never are the chances for issue of shares worse than at such times—there are only two ways to reduce a firm's indebtedness: (*a*) the redemption of debts out of disinvestment of stocks and equipment (e.g. by reduction of stocks and non-investment of earned depreciation on equipment); or (*b*) the redemption of debts out of retained profits.

The former solution, when chosen by many firms at the same time, causes a general process of disinvestment and contraction, with all the accompanying consequences of further decline of earnings-prospects in general, and involves, moreover, some disorganization of individual firms. Such a process is most harmful to the economy as a whole, for entrepreneurs do their utmost to redeem their debts to rentiers who, in turn, will find no new outlet in business for the redeemed amounts.

The second solution will be chosen by entrepreneurs whenever practicable. It is more advantageous for them to recover financial soundness by means of additional business savings than by contracting their business to the reduced size their shrunken venture-capital permits. Moreover, the restoration of their indebtedness-ratio to a safer level by means of savings can proceed much faster than its restoration through debt-redemption out of disinvestment.

Viewed macro-economically, an addition to business venture-capital out of retained profits has important advantages. If the venture-capital of firms is thus expanded, there will be less necessity for them to redeem debts to rentiers and they will show less disinclination towards contracting new debts. This is a paradoxical situation: the larger the supply of venture-capital to firms, the smaller the quantity of rentiers-savings that tends to become redundant.

End of the downturn. The end of the downturn, and therefore the beginning of the upturn, will be reached when firms have managed to reduce their indebtedness-ratio to a level that is considered safe at current earnings-prospects. Before this position has been reached, no profit-expectation of less than phenomenal size could induce a firm to expand with additionally borrowed money. An over-indebted firm is insensitive to the possibility of expansion; a soundly financed firm, however, is ready to react to all openings for profitable expansion.

III

In the preceding paragraph we have assumed that the supply of venture-capital from the capital market was nil. In reality that supply plays a more important role, but never in a stabilizing way. The capital market is ready to supply some venture-capital to firms when they are already expanding and have good earning-prospects; but the moment their earning-prospects decline and firms are becoming afraid of the pressure of their debts, the share market usually withdraws its support. Usually the risk-shyness of savers and the debt-shyness of entrepreneurs increase and decrease together, and each from its side helps to stimulate business fluctuations.

There are two forces that can help to bridge the gap between the risk-shyness of savers and the debt-shyness of entrepreneurs. The one is the force of a consistently high profit-expectation (net after taxes), which might help to reduce both the debt-shyness of entrepreneurs and the risk-shyness of savers. In the present state of Western society, however, a consistently high level of net profits for firms and high net dividends for savers seem quite improbable. Only spasmodically is there a semblance of such high profits and dividends. The other is the force of business savings, which are at the entrepreneur's disposal even if profit-expectations are low, and help to alleviate the shortage of venture-capital. As a matter of fact there is much more reason for such savings to be made when profit-expectations are low than when profit-expectations are so high that savers are ready to supply venture-capital.

If the theory expounded is correct, a high volume of retained profits can help to ward off a depression; and in the event of a depression, the

formation of business savings is one of the best remedies against a prolonged downswing and chronic stagnation. For a large formation of business savings helps to prevent a part of rentiers' savings from becoming redundant. The implications for business-cycle policy seem to be:

1. A high degree of indebtedness and a short supply of venture-capital will stimulate the propensity to save out of profits.
2. A high degree of indebtedness and a short supply of venture-capital will deter net investment by firms and stimulate net disinvestment by firms.
3. Business savings, like any other kind of savings, depress consumption; but they stimulate investment by the firm that makes the savings.
4. Policies directed towards the restriction of the formation of business savings are effective for the prevention of a rapid expansion of activity. But their consequences are irreparable and may be the cause of depressions that would not occur if firms were enabled to accumulate enough venture-capital. Policies directed towards the distribution of companies' reserves to shareholders, or the annexation of such reserves by the fiscal authorities, are detrimental to the inducement to invest and may even be a stimulus to disinvestment.

OVERVEEN, THE NETHERLANDS.

IS ADAM SMITH OUT OF DATE?[1]

By S. MOOS

At a time when the more advanced countries are run by a vast body of local and central administrators, when national economies are protected by elaborate systems of tariffs, quotas, subsidies, and exchange controls, the student of economics knowingly smiles at the very mention of the name of Adam Smith. It means those concepts of unproductive labour, of free trade, and of labour as measure of value considered typical of eighteenth-century thought. Today we know better. . . .

The present paper inquires how far Adam Smith's ideas about unproductive labour are important today. The concept of unproductive labour will be examined and its relation to consumption, to defence, to capital investment, and to non-manual work. The problem of measuring productiveness will emerge at several points. The investigation is meant to be of an exploratory character only, and perhaps it might succeed in stimulating others to a more thorough analysis of this set of problems.

The *Wealth of Nations* starts with the statement that manual labour is the source of the nation's income and that the decisive factor is not so much the quantity but the quality of labour, its skill, its dexterity, and the 'judgement with which it is generally applied'. And on the first page we are introduced to the division between 'useful labour' and other employed.

Because Adam Smith classified as unproductive many activities which we consider productive, we have thrown overboard, or at least greatly neglected, the concept as such. Today we are inclined to consider every paid activity as adding to the national income and thus as productive. We trust that there is an automatic check on any unproductive labour: if goods and services did not come forward according to the incomes derived from producing them, there would arise a corresponding scarcity which would make goods and services more expensive, thus reducing real national income and punishing the deficiency in productivity. This method seems unsatisfactory for three reasons: first, what matters is not so much to see the global effect of unproductive labour as to track down the exact location of its cause. Secondly, the unproductivity in one sector of the economy may have been balanced by higher productivity in another sector so that no fall in real national income will occur or the latter might even rise although considerable loss through unproductive labour has been incurred. Thirdly, the loss in real national income might be caused not

[1] The completion of this article has been made possible by a grant of the Research Fund Committee of the Durham Colleges.

only by unproductive labour but also by unemployed labour or by the ageing of the population, and it would be difficult to separate those factors.

Unproductive labour can be observed in so many forms that its existence need hardly be proved: the overpopulated backward areas of the world with too many agricultural workers per acre of land; the labour hoarded in British factories by employers afraid of losing these workers on a labour market emptied by a continuous state of full employment; a surplus of industrial bureaucracy reared on the flesh-pots of the cost-plus system[1] (also the mechanism of the excess profits tax, or even of ordinary profits tax, was such that great expense for a relatively small productive effort was still profitable for a firm, as the taxable income was correspondingly reduced). It is difficult to measure the productivity of the Civil Service; but a system where the social status of the heads of departments depends partly on the number of employees in their department would tend to produce a certain proportion of unproductive labour although the popular ideas about the unproductivity of the Civil Service are certainly exaggerated. As, in this case, productive capacity must be kept at a level sufficient for peak hours, weeks, and months, necessarily a go-slow atmosphere will develop in the slack periods.

The Concept of Unproductive Labour.

How then are we to define, or to detect, unproductive labour? Let us first review Adam Smith's ideas. 'There is', he states, 'one sort of labour which adds to the value of the subject upon which it is bestowed: there is another which has no such effect. The former, as it produces a value, may be called productive; the latter, unproductive labour.' The services of the menial servant are unproductive because they 'perish in the very instant of their performance'. Labour which does not realize itself in a permanent subject which can be exchanged is unproductive. As a result of this definition the sovereign and the officers of justice and of war find themselves side by side with 'churchmen, lawyers, physicians, men of letters of all kinds, players, buffoons, musicians, opera-singers, opera-dancers, &c.'

Adam Smith continues to distinguish between expenditure which favours productive labour and that which results in unproductive labour. Great lords, rich merchants 'feed generally more idle than industrious people'. And from this line of thought emerge productive and unproductive towns. In mercantile and manufacturing towns ordinary people are

[1] Government contracts which allow a given percentage of profit to be added to manufacturing costs, so that the profit in £ *s. d.* increases automatically with an increase in costs of production, so that inefficiency and unproductive waste resulting in higher costs are actually rewarded.

industrious, sober, and thriving. In towns where people are maintained chiefly by spending of revenue there idleness prevails.

It was in this classification of manufacturers and merchants as productive that Adam Smith drew a clear line between himself and the physiocrats. The physiocrats had distorted their argument by insisting that agriculture was the only field of productive labour although it was merely the one field in which their ideas of productivity could be most easily and obviously demonstrated. It will be remembered that the physiocrats considered only surplus-creating labour as productive, that is labour which produced more than it consumed in the course of production. Their 'produit net' might equal gross national product minus consumption, but probably meant gross national product minus consumption minus depreciation and maintenance, leaving net investment as the measure of productivity.

Consumption and Accumulation

Adam Smith argued that any work which reproduced the annual consumption used up in the process of production and which maintained the existing stock or capital was productive, and he gave as example a marriage producing a son and a daughter which could not possibly be called barren or unproductive as it had safeguarded the continuation of the human species although it had not increased it. And Adam Smith would concede only that a marriage with three children was more productive than one with two. He was so much concerned with the defence of manufacturers and merchants as productive that he neglected a decisive aspect of his argument with the physiocrats: the difference between a national product which yields net investment and a national product which does not.

Today's critics of Adam Smith have succumbed to a similar mistake: they concentrate on Adam Smith's classification of menial servants, &c., as unproductive while his main contribution, as Malthus so rightly said, was just his insistence that there is productive and unproductive labour. This distinction between the different kinds of labour, said Malthus, must be considered as 'clearly the cornerstone of Adam Smith's work, and the foundation on which the main body of his reasoning rests'. Malthus anticipated much of later criticism by granting that there were exertions which indirectly contributed to the production of wealth, but if we were to include them in the definition of productive labour,

> 'the term would cease to have any definite and useful significance so as to admit of being applied with advantage to an explanation of the causes of the wealth of nations. It would at once confound the effects even of production and consumption, as there is certainly no indirect cause of production so powerful as consumption.'

Malthus after thus having affirmed the great truth that specific purposes

need specific definitions, and that a definition may be right for one purpose and meaningless for another, stated that the great merit of Adam Smith's definition is the precise distinction between matter and not matter, and 'between what is susceptible to accumulation and definite valuation and what is without either one or both of these essential properties'.

To stress his points, Malthus assumed the existence of two countries with identical resources of man-power and material, but one country with a great proportion of its population being engaged in manufacture and trade, and another country with a similar proportion being occupied with domestic service and in the army, and he concluded that 'the former might have all the indications of wealth, and the latter all the symptoms of poverty'.

In interpreting Adam Smith, Malthus also modified the concept of the identity of unproductive labour and personal service by pointing out that one and the same person might do productive and unproductive work, i.e. that it was wrong to label certain workers as unproductive, a classification which should be reserved for the kind of services and goods produced.

When reading the extensive modern literature on national income we notice how topical these issues are and how puzzling they remain. In his *National Income, A Summary of Findings*, S. Kuznets, for instance, discusses as a major problem the productive nature of consumption. Does not the consumption of butter by the wage-earner and its conversion into health and productive efficiency and possibly into a new generation of producers appear in the value of his labour and his output? Is therefore consumption ultimate or only intermediate like cream used for butter? And how far is the use of the bus carrying the worker to and from work productive, or the education individuals receive to become creative and efficient citizens, &c.?

Kuznets rejects this approach because it would be either extremely difficult to separate, in practice, productive and unproductive consumption in the above sense, or we would have to abandon the concept of ultimate consumption altogether, a process which would be contrary to all our ideas of using national income as a measure of consumers' satisfaction which is assumed to be the ultimate goal of our society and of our social philosophy.

Defence

Relegated to a footnote, an important qualification is made in Kuznets's book: that any other criterion of economic activity would need another definition of national income and would necessarily yield other results. Kuznets agrees that a major war, for instance, would demand different assumptions, but this would represent only an 'exceptionally short period';

generally the 'widely accepted', 'customary' definition of national income could be defended as the sole valid one.

But the periods of heavy military expenditure are no longer exceptionally short. If we have within 30 years two major wars lasting 9 years, some additional years of pre-war rearmament, and if a few years after the end of World War II the country with the world's highest share of industrial output spends some $15,000 million annually for military purposes, this expenditure has become more 'customary' than exceptional, and therefore our assumptions, definitions, and calculations would have to be changed accordingly. However, this would only be necessary if we consider defence expenditure as not falling within our concept of consumers' satisfaction. If we would accept a definition suggested in Mr. J. R. Hicks's *Social Framework*, the satisfaction of consumers' wants would include individual as well as collective wants, the latter being served, for instance, by the whole of the armed forces and of the munition industries. Such a definition of defence expenditure as satisfaction of collective wants would be foolproof as far as the demands of abstract reasoning are concerned; but it does not seem adequate when a country prefers sometimes guns and sometimes butter, or one country prefers guns and another country butter. If we want to measure and compare social welfare or military burdens at different times or in different countries, the individual and collective wants of communities must, I think, be kept apart.

This would, incidentally, be more in line with Adam Smith's ideas about war expenditure. Actually Adam Smith condemned public expenditure as unproductive largely on account of the sums spent for military purposes. In the classification of this expenditure as unproductive he contradicted even his own definitions, according to which the addition of value and the creation of marketable objects of a permanent nature was productive; and rifles and battleships, and tools to produce them, would get a good pass in this test. But Adam Smith speaks of great fleets and armies

'who in time of peace produce nothing, and in time of war acquire nothing which can compensate the expense of maintaining them, even while the war lasts. Such people, as they themselves produce nothing, are all maintained by the produce of other men's labour. When multiplied therefore to an unnecessary number, they may in a particular year consume so great a share of this produce, as not to leave a sufficiency for maintaining the productive labourers, who should reproduce it next year. . . .

'Those unproductive hands who should be maintained by a part only of the spare revenue of the people, may consume so great a share of their whole revenue, and thereby oblige so great a number to encroach upon their capitals, upon the funds destined for the maintenance of productive labour, that all the frugality and good conduct of individuals may not be able to compensate the waste and degradation of produce occasioned by this violent and forced encroachment. . . . Had not those wars given this particular direction to so large a capital, the greater part of it would naturally have been employed in maintaining productive hands, whose labour

would have replaced with a profit the whole value of their consumption. . . . More houses would have been built, more lands would have been improved, . . . more manufactures would have been established . . . and to what height the real wealth and revenue of the country might, by this time, have been raised, it is not very easy for us to imagine.'

Later in this book, when he writes 'Of the Expenses of Defence', Adam Smith draws attention to the fact that wars become more and more expensive as society advances in civilization. While the javelin and arrow were cheap, easy to carry, and could be used again and again, modern weapons are expensive to produce, expensive to transport, and the effectiveness of the weapons in the hands of the enemy considerably increases the cost of defence measures such as fortifications, &c.

Adam Smith's attitude to defence as entirely unproductive was probably influenced by the character of armed forces in the eighteenth century when there were not many common factors between peaceful economic pursuits and military activities. Today the issue has become more complicated. World War II had led to an outburst of inventive genius the fruits of which when applied to peaceful purposes should considerably add to the wealth of nations; recent developments in electronics, jet propulsion, atomic energy, aeronautics, metal alloys, synthetics, and modern drugs might have come about much later or, in some cases, not at all. The costliness and risk of the experimental years might have been too great for the profit motive (private or public) to work as an incentive.

With regard to man-power, large parts of today's armed forces provide a training for mechanical skills which is recognized by trade unions.[1] A general classification of armed forces as unproductive, as Adam Smith did, needs therefore some qualification today. In addition to this direct connexion between military effort and civilian productivity there emerges the indirect relation between defence and productive effort. Is it true to say, for instance, that the money or man-power spent on defence could have been used for producing more consumption or investment goods, i.e. can opportunity costs of defence really correctly be measured by multiplying man-power with annual average output as is sometimes suggested? Does not the question arise for how long goods would be available in a country without defence *in the world of today*? For how long could a nation maintain creditworthiness and the confidence of its trade partners decisive for its export trade and its prosperity at home if it could not offer a probability of national independence? On the other hand, if the defence expenditure is too heavy for a balanced and healthy economy, the resulting economic crisis would be as disastrous as the lack of defence.

[1] Some factors common to modern industry and to the modern army—such as the attitudes to skill, work, and to voluntary discipline, the function of group loyalties and leadership, have been mentioned in 'Morale, Military and Industrial', by E. H. Phelps Brown, *Economic Journal*, March 1949.

There is thus an upper limit to defence expenditure set by the possibilities of taxation and of borrowing, and by the needs of governments other than defence. In a democratic society this limit will depend on the traditional standard of living, as no government hoping to emerge victorious from the next election could dare carrying out or advocating such a lowering of living conditions. Even a totalitarian country is faced with similar limitations. Civilian morale, on which so much depends in modern war, would in all likelihood seriously suffer if the standard of living had been reduced in the period preceding hostilities.

Between these two limits, that of minimum international security and that of national resources, of civilian morale and of parliamentary democracy, there may be a point where just enough resources are used for defence to maintain international security and still not as many as would endanger the stability of the private sector of the economy. But it is equally possible that this security equilibrium point does not exist, that is, that the requirements of military security exceed the resources available in a society aiming at social security. If the international situation and/or technical developments would produce such a disequilibrium, the solution would have to be found in fields other than shifts in domestic resources.

As we shall never know *a priori* whether the use of resources for defence is near equilibrium point or where this point exactly lies, we shall be incapable of stating which part of defence can be considered productive. In the case of early surrender, as in the case of Belgium, Denmark, and France in 1940, most of the defence expenditure of the preceding twenty years—a quite considerable sum—turned out to have been rather unproductive. These countries had spent either too little or too much. (We have been witnessing in western Germany what lack of defence can mean in terms of prosperity.)

Still, Adam Smith's idea that the armed forces might grow to an *unnecessary number* and therefore so consume too great a share of the national product could possibly be elaborated by trying to establish a 'sound' proportion of defence expenditure to total income and by giving the 'sound' as well as the 'unsound' proportion separately in the national income accounts. This would make it easier to compare different countries and different periods, and sometimes even to prevent a harmful distribution of national resources. The cut in British defence expenditure in 1947 resulted from the pressure of economic events and of public opinion, and not from planning the different sectors of the economy.

Capital Investment

Although Adam Smith considered war as a major source of unproductive effort (in the field of production), it is only part of his concept of

waste. This includes 'every injudicious and unsuccessful project in agriculture, mines, fisheries, trade, or manufactures' which tends 'to diminish the funds destined for the maintenance of productive labour'. It includes every diminution in the total product which could have been avoided by a fuller or wiser use of the productive resources. Although putting this idea into practice would encounter tremendous difficulties, it might still be possible to work out national income targets for the future based on several assumptions, one of them being the full employment of available manpower in the most efficient firms, producing every year a high proportion of new industrial plant and equipment.

A detailed classification of investment in national income accounts is therefore at least as important as the details given there regarding private consumption.[1] The need for the most productive forms of investment would seem especially urgent for countries with backward industrial equipment. Houses, roads, parks, generators, tools for producing slot-machines are all investment, but a national income with an investment sector which concentrates on slot-machines and monuments is different from one producing generators and harvesters.

Adam Smith compared two private individuals, one of them investing his money in horses, dogs, and menial servants, the other constructing buildings and acquiring furniture, books, pictures, jewels, fine clothes, &c. Although the income and expenditure of both men was assumed to be identical, at the end of a given period the latter would be much richer than the former. With regard to industrial investment, that capital was considered to be employed most advantageously which maintained the greatest quantity of productive labour and yielded the greatest increase in the annual produce of land and labour. An industry with a quick turnover could employ more workers per year than an industry with a slower

[1] The classification of gross fixed investment in the U.K. as given in the Economic Survey subdivides the total into seven main categories, such as 'Defence and Administration', 'Other Industries' comprising practically all manufacturing industry, or 'Housing': no attempt has been made at distinguishing different kinds of investment according to social purpose. For instance, in the £15 millions for Government Buildings in 1949 the following items are lumped together: New Government Offices in Whitehall Gardens; New Colonial Office; Accommodation for Government Departments to be provided by private owners; Workers' Camps and Hostels; Houses of Parliament; Royal Palaces; Museums; Art Galleries; Department of Scientific and Industrial Research Laboratories; and Ministry of Pensions Hospitals. Judged by economic and social standards, the expenditure for laboratories and workers' hostels clearly belongs to another category than the rest of the items.

The classification of Public Expenditure as presented in the *Financial Statement* issued annually by the Treasury creates similar features. Even in the new classification 'Loans and Other non-Revenue Items' we find Excess Profits Tax Refunds, War Damage Payments, Loans to Allies side by side with Loans for New Towns Development. Only careful perusal of the various items in current and capital expenditure makes it possible to compile the total burden arising from World Wars I and II, and from present defence expenditure. There is also this extraordinary item under 'Other National Services (General)': of 'Works, Buildings, Stationery and Information Services'.

turnover, and for this reason an industry catering for the home market would be more productive than one catering for the foreign market, as transactions with the latter involved a slower turnover. And, finally, the industry which provided goods for subsistence was necessarily prior to that which ministered to conveniency and luxury. Thus a system of priorities in investment emerges: investment for production; investment for necessaries; investment for durable consumption goods, investment for non-durable goods of conveniency and luxury; investment for exports. Investment for exports needed for the import of category one and two would probably have to move up.

It almost appears as if Adam Smith had been a super-planner, but he was convinced that once the truth was recognized, society would automatically strive to achieve it, and, under the guidance and blessing of a higher being, would have good prospects of reaching their goal. Thus there was no need for Adam Smith to trouble his head about which means should be applied to achieve the pronounced aims if the social and economic mechanism did not work in the desired direction.

The above sequence of priorities does not take account of the problems of marketing and the deficiency of effective demand and is simply based on considerations of the highest possible increase in national wealth. It was perhaps tacitly assumed—what Malthus formulated later—that the existence of unproductive consumers would counteract a too speedy capital accumulation and thus prevent the capitalist system from being disrupted by deficiency of effective demand. Although Adam Smith never defended the unproductive consumer on these grounds as Malthus did, he considered his existence as essential to civilized society.

Non-Manual Work

That brings us right back to where we set out, to the classification of productive and unproductive labour as the basis of Adam Smith's thoughts. Here it might be useful to clear up some misunderstandings about the classification of clerical and professional work in the national output. Since Adam Smith used the term unproductive only as meaning 'not producing matter', the omnibus-category of unproductive labour hereby created lent itself to misinterpretation. But Adam Smith was well aware of the role of transport, trade, and professional work in the economy. Enumerating in his Introduction to the *Wealth of Nations* the activities needed to provide a labourer with his means of existence, he mentions the merchants and carriers employed in transporting the materials; commerce and navigation; the knowledge and art requisite for preparing the glass window, 'that beautiful and happy invention ... which lets in the heat and the light and keeps out the wind and the rain'. Later on, 'good roads,

canals and navigable rivers' are praised for diminishing the expense of carriage and encouraging the cultivation of the remote.

In discussing the 'Component Parts of the Price of Commodities' Adam Smith mentions the 'labour of inspection and direction' which in many great works is mostly committed to some principal clerk whose wages are fixed with regard not only to his labour and skill but also to the trust 'reposed in him'. And in his famous chapter on 'Inequalities arising from the Nature of the Employments themselves' he proposes high incomes for the 'ingenious arts and liberal professions' such as painters, sculptors, lawyers, physicians, not only to reward a tedious and expensive education but also on account of the great risk of remaining a mediocrity or less. And he protested vigorously against the low salaries of the teacher of the sciences. 'Before the invention of the art of printing, a scholar and a beggar seem to have been terms very nearly synonymous. The different governors of the universities before that time appear to have often granted licences to their scholars to beg.'

Adam Smith was, as we have seen, in favour of keeping armed forces of a reasonable size, and he considered it a duty of the sovereign or commonwealth to erect and maintain public institutions and public works which could not be expected to be undertaken by groups of private individuals because of an insufficient rate of profit. The government had also to administer justice, facilitate commerce, and instruct the people.

Thus we find a large category of 'unproductive' citizens considered essential for society: merchants, sailors, captains of ships, managerial staff and inventors, artists and scientists, teachers and civil servants, &c. We are driven to the conclusion that Adam Smith did not introduce his classification in order to degrade the unproductive occupations (otherwise he would not have pleaded for many of their incomes to be higher than those for productive labour) but in order to find a measure for the wealth of a nation which would depend on the proportion between productive and unproductive labour. It was this proportion between matter actually produced for consumption and the number of people sharing in the consumption of this matter which occupied Adam Smith's mind.

The problem which occupations we have to include in the production of matter and what their proportions should be is more hotly debated today than it was in Adam Smith's time, and his merit in concentrating on it seems the greater. A school of thought is growing up which insists that the proportion of clerical and administrative staff to manual workers is much too high in this country and that the lack of efficiency in our industry and the slow increase in our national output is mainly caused by this maldistribution of man-power resources. Several studies of efficiency in the U.S.A. and Great Britain have emphasized this point.

A recent report made by a member of the Coal Board, Mr. T. E. B. Young, after a visit to the U.S.A. stated that in the U.S.A. 72 per cent. of miners are 'actual productive labour', 18 per cent. other underground workers, and 10 per cent. surface workers, while the percentages in Great Britain were 26, 50, and 24 per cent. respectively. It is interesting to note that even ancillary work at the face and haulage work is here excluded from the term 'actual productive labour', so that the Adam Smith definition of creating matter is applied here in the strictest sense. And it is partly this definition which lies behind the redeployment schemes and is responsible for the statements of managerial experts that production in British industry, with existing equipment, could be doubled and trebled.

While in economic theory we have 'advanced' to the ideas of Say who considers the purchase of a commodity or service as sufficient evidence that the activities connected with creating this utility have been productive, in practice we begin to revert to Adam Smith, distinguishing between productive and unproductive labour and between different degrees of productivity. Even in the U.S.S.R. and in the east European countries which are preoccupied with this problem as a result of the Marxist approach to economics, the controversy is continued whether Marxist theory should consider government services and passenger transport as productive or unproductive and whether they should accordingly be included or excluded from the national income. While in Western national income statistics it is recommended to include those government services supplied directly to the ultimate consumer, and leave out other services as 'intermediate', in the U.S.S.R. it is just the category of direct consumer services supplied by the government which are excluded if they do not form part of current production. Seen with a view to the concept of productivity this practice seems highly unsatisfactory, as health, administrative, and social services cannot possibly be productive when under the auspices of a trust or co-operative and unproductive when carried out directly by the government.

The Problem of Measurement

Is there then any possibility to get some order into the present rather chaotic state of this field of theory and of statistics? Any attempt to classify occupations as productive and unproductive will soon have to be abandoned as the difficulties of interrelations and interpretation overwhelm the eager researcher. We may attempt a classification according to the kind of goods and services rendered. We might, as the Russians do, consider defence expenditure (or income), social services, and health services as unproductive. We would have to settle the dispute whether all government activities, including defence, are final services, the government appearing as ultimate consumer, or whether all activities aiming at

the maintenance of the existing social system are intermediate products, that is the government acting as producer, or whether some government activities are to be considered final and others intermediate.

A promising line of approach might be offered by working out certain proportions between different kinds of occupations, trades, and services. An attempt in this direction has been made by the establishment of man-power budgets, and these budgets could possibly be worked out in more detail. For this purpose a uniform occupational classification would be needed. Recently by a purely administrative measure book-keepers in government industrial establishments were shifted from the grade of 'industrials' to the grade of 'non-industrials'; in some statistics 'operatives employed in warehouses and stores and canteen staffs' are treated as wage earners; office staff, shop assistants, foremen, draughtsmen are treated as salary earners. Without a certain unified terminology it is difficult to compare the composition of personnel in different firms and to discover how far a firm is using too high or too low a proportion of administrative, clerical, or distributive personnel. In many cases the proportions may be too low and an addition of technical and clerical staff skilled, for instance, in time and motion study or modern cost-accounting might easily increase productivity. One of the possibilities of grading according to a concept of productivity might be as follows:

I. Workers
   (*a*) engaged in production;
   (*b*) ,, ,, storage, handling, packing, and transport.

II. Foremen, chargehands, and supervisory staff.

III. Clerical and administrative staff:
   (*a*) engaged in work connected with the production line;
   (*b*) ,, ,, contact with other firms;
   (*c*) ,, ,, contact with authorities;
   (*d*) ,, ,, publicity and sales.

The question arises of how to compare two firms, even if they are of similar size and produce similar products, if they have different quantities of capital equipment and buy different proportions of goods and services from outside. In a paper on 'The Measurement of Overall Effectiveness of a Production Unit' read by Sir Ewart Smith to the British Institute of Management it has been suggested to convert capital equipment and services received into man-power equivalents. The value of capital equipment would be divided by average annual income for industrial employees of all kinds and the result spread over the expected lifetime of plant, at present value. This method suggested for measuring productivity per

unit of output could also be used or adjusted for comparing the composition of the labour force of different firms. Such an idea would also help in realizing a suggestion made by Dr. Rostas in the discussion on the paper mentioned above to express the output of different products in terms of labour-content weights.

With the increased emphasis on productivity the question of labour content in output has also been brought forward as a method to make cost accounting of different firms comparable. The Institute of Chartered Accountants in England and Wales, in one of their recent publications, *Developments in Cost Accounting*, consider the best unit for budgeting output the Standard Hour. 'It is the amount of work or output of any given product or process which it is estimated should be produced in one clock hour.' Further on Standard Costing is recommended, involving 'the setting up of standards as a basis for judging actual performance'. The standards should be set up according to a good, efficient, but not ideal performance and should be occasionally revised. The Temporary National Economic Committee in their *Investigation of Concentration of Economic Power* mentions the following tests they have used for establishing and comparing productivity:

> The selection of product; the selection of a time period which the test is to cover; the obtaining of the costs of all companies engaged in the production of this product for which costs are available; the classification of each company as large, medium-sized or small. The costs of the various companies engaged in the production of this product together with a size classification for each company are then arranged in order of ascending costs, from lowest to highest. The ascending cost series then shows the relationship between size and cost.

In this way they could establish ideal, lowest unit costs.

These concepts of the Standard Hour, the Standard Output, the Man-power Content of Capital and Services, the Ideal Unit Cost emerged in recent years, not from economic theoreticians but from cost accountants, efficiency experts, and monopoly-chasing civil servants, and the problem arises how far economic theory is to take account of these developments. These new concepts, standards, and targets leave still many questions unanswered. Once we measure productivity in relation to these standards, we shall know if some goods or services have been produced with a minimum loss of productive effort, but we shall not know how far these goods and services are the ones most needed by the nation and are making the nation wealthier in the sense of Adam Smith.

How to assure that capital goods and necessaries and exports covering these two needs are satisfied before non-essential goods and services? Could not the national income accounts be used for another classification into capital goods, essential wants, non-essential demands and military needs, and another classification of national investment be introduced according

to social priorities and showing the share of net investment, in relation to these priorities, to the existing wealth and to national income? With regard to the distribution of man-power, use could be made of a more detailed man-power budget. The International Labour Office in their study on *Employment, Unemployment, and Labour Force Statistics*, for instance, point out that 'effective social policy in periods of reconstruction, *even more than in wartime* [italics mine] must be based upon a knowledge of the number and characteristics of both present workers and those potentially available. Such data . . . can point out the actual uses of man-power by industry. Thus in one country, for example, data on the increasing number of persons engaged in non-essential construction activities emphasized the possibility of using that labour in other activities.'

Many of these suggestions and measures taste of more bureaucracy, industrial and governmental, and one might argue: why not leave the distribution of the productive effort to the price mechanism? What is produced at a given moment creates the greatest possible individual and collective satisfaction according to the existing distribution of income and wealth and according to consumers', managers', and the government's preferences. This is correct but we have not the slightest idea of how far greater the satisfaction might have been by cutting out waste, imperfections of the market, and irrational decisions. The section of the economy where satisfaction is regulated by price is relatively small. Government activities are excluded, domestic activities are excluded (the latter estimated at 25 per cent. of national income), commodities with low demand-elasticities and regulated by price-control and price-maintenance schemes are no good measure, neither are commodities imposed on the consumer by a selling campaign nor commodities in short supply. If we add all the other imperfections of the market, relatively little is left of price as a measure of satisfaction and of productive effort. The Report on Steel Founding published by the Anglo-American Council on Productivity stated:

> 'The objections to using money equivalents as a basis of comparison lie in the circumstances that no economic system exists wherein prices are an accurate reflection of the human effort expended, that the dollar-pound exchange rate is an incomplete guide to equivalent values of anything but gold, and that the present shortage is manpower. Only by concentrating upon productivity in terms of manpower can improvements be made in the use of manpower.'

Conclusions

The ultimate method for achieving Adam Smith's ideal could only be the removal of the imperfections of the market. But this is a very far-away aim. Until this is reached, the bureaucratic method seems unavoidable; that is, standard costing, standard hours, budgeting and

targets, a unified classification of man-power and man-power contents would have to be built up from below by firms and industries to arrive at a national total. As long as the distribution of man-power is a freak result of historical forces and irrational desires, as long as it is distorted by the memories of the depressed areas and of underpaid essential industries, on the one hand, and by the magnetic force of high wages and profits of non-essential industries, on the other, the productive effort cannot obey the demands of an optimum national output and social welfare. A man-power budget from above modelled on the priorities of Adam Smith would have to be considered. This budget would not be a 'target' to be aimed at or to be achieved within one year by compulsory methods, but a long-term aim to be approached with the help of vocational guidance and of a change in the comparative net advantage of industries and occupations from which or into which workers are hoped to move. And, finally, an improvement of the national income accounts as suggested above could add to the awareness that neither price nor output per man hour in itself is a sufficient guide to total welfare without a certain pattern of an ideal distribution of man-power, of social priorities, and without a concept of social waste and social luxury.

One of the most important measures of actual and potential progress—net investment—would have to emerge from hidden-away corners to the front page of national income accounts. In this way our relative ignorance with regard to the wealth, welfare, and defensive strength which we could enjoy if our material and man-power resources were used near their optimum capacity would slowly recede. But, first of all, one would have to agree that under present circumstances and in the near future price does not adequately fulfil the function of maximizing effort or satisfaction in the economy as a whole, or at least that we rarely know whether or when this does occur. The fact that we live in times when considerable price changes of very uneven distribution occur over a short period of time and thus make the use of price indices more hazardous than usual makes the search for supplementary and alternative methods more urgent.

THE DURHAM COLLEGES,
UNIVERSITY OF DURHAM.

THE ORIGINS OF INDUSTRIAL PEACE: THE MANUFACTURED IRON TRADE OF THE NORTH OF ENGLAND

By A. J. ODBER

I

THE Conciliation Act of 1896 was the first official attempt to improve relations between employers and employed which can be said to have been even partly effective. By this Act the Board of Trade was empowered to inquire into industrial disputes, to appoint a conciliator, at the request of either of the parties to the dispute, or to appoint an arbitrator if both parties requested it. No compulsory powers, not even to call witnesses, were granted, and either party could refuse to recognize the conciliator. The work of Mr. G. R. Askwith (later Lord Askwith) as a counciliator under this Act has been well described by himself in *Industrial Problems and Disputes*. There he describes his intervention in disputes in many different industries. Some industries seem to have troubled him rarely or not at all. In a number of cases this was because they had already found their own way to prevent or much reduce disputes between masters and men before the passing of the 1896 Act.

Miss Elizabeth Brunner has already described how this was done in the boot and shoe industry.[1] Another important industry which had little need of the 1896 Act was iron and steel. Askwith was occasionally called to settle a dispute in the industry, as, for example, when he fixed bar-cutters' wages in the south Wales tin-plate trade in 1904. Usually, however, disputes were settled inside the industry, for the various sections already had their own methods of maintaining good industrial relations, some with joint conferences, others with joint sliding-scale committees, and still others, particularly in the manufactured iron trade, with more formal boards of conciliation and arbitration.

This paper is an account of the establishment in 1869 of the first of these formal boards in the iron industry—the Board of Conciliation and Arbitration for the Manufactured Iron Trade of the North of England.[2]

II

Before the actual creation of this board is described, something must be said of the rapid growth of the iron industry of the north-east of England

[1] *Oxford Economic Papers*, June 1949, 'The Origins of Industrial Peace: The Case of the British Boot and Shoe Industry'.

[2] Despite its title, the board catered for firms in the north-east of England only and did not include firms in Cumberland or Lancs. Many iron firms in the north-west and elsewhere did voluntarily follow the board's decisions.

and of the effect of this growth on the relations between management and men in the industry. The expansion of the industry will be discussed in this section and the influx of new labour in the next.

There had been some few pig-iron makers and malleable iron makers in the area since early in the nineteenth century, but they had had to rely on Scottish iron ore. Ore beds were known to exist at Whitby, and about 1844 Lowthian Bell conducted a series of experiments with ore from Grosmont near Whitby in the blast-furnaces of the Walker ironworks on Tyneside. These experiments were abandoned after a year, as Bell had come to the conclusion that better pig-iron could be made out of Scottish blackband ore,[1] which had a much higher iron content than Whitby ore. Bell could not have been completely disappointed with his experiments, for some time later he again tried ore from Grosmont, and, as more experience was gained, the quality of the resultant pig improved.

Until 1838 the manager at Walker had been John Vaughan, but in that year he left to go into partnership with Henry Bolckow. They founded the firm of Bolckow & Vaughan and began manufacturing iron bars at Middlesbrough. As the firm grew it found difficulties in obtaining a regular supply of suitable pig-iron, and so in 1846 blast-furnaces were built at Witton Park to use ore from local coal seams. This was insufficient so Whitby ore was used. In 1850 the main iron ore seam was traced, perhaps by Vaughan, from Grosmont right across the Cleveland Hills to Middlesbrough so the firm built three new furnaces nearer to that town and to the ore beds. By now Lowthian Bell was also satisfied that the use of Cleveland ore would be economical, and in 1852 he leased the newly discovered ore-fields at Normanby. Two years later he began building the Clarence Works on the north bank of the Tees.

Everything was favourable to a rapid expansion of iron-making. The ore contained only 30 per cent. of iron, but the seams were thick and near to the surface. Extraction was easy and royalties low.[2] Moreover, the mines were near to good cheap coking-coal and to the sea. These advantages were quickly made use of, and the district's pig-iron output, which had been about 100,000 tons in 1847, rose to 660,000 tons in 1860 and to 1,630,000 tons in 1870.[3]

Here, however, we are concerned with the manufactured iron trade, that is with the conversion of pig-iron into finished malleable iron by puddling and rolling. The above statistics of pig-iron output, though interesting in

[1] Greville Jones, 'Bell Brothers' Blast-Furnaces from 1844–1908', *Journal of the Iron and Steel Institute*, 1908, iii, p. 60.

[2] S. Griffiths, *Guide to the Iron Trade of Great Britain*, 1873, pp. 119–21.

[3] There was also a rapid growth of pig-iron production relative to that of other areas. In 1873 the north-east of England had 130 furnaces in blast and 26 building. The rest of Britain had 585 in blast and 18 building, and of these 13 were going up in the equally new area of north-west England. See Griffiths, op. cit., pp. 253–67.

themselves, cannot be taken to prove an equally rapid expansion of the malleable iron trade, for in those days pig-iron was often made in one district and then sent to another for puddling and rolling. Unfortunately, as Bell discovered,[1] detailed statistics similar to those for the make of pig-iron were not available for malleable iron produced in the north-east of England before 1872. Even so, the evidence points to a rapid growth of malleable iron production, and Griffiths claimed that it grew almost 'pari passu with pig iron making'.[2] The available statistics support his claim:

North of England Iron Trades: Weekly Output (Tons)

	1856	*1872*	*Approx. percentage increase*
Pig-iron	8590[3]	37,865[4]	340
Malleable	2660[3]	11,736	340

Even this does not show the full growth of output of malleable iron between the two dates, as the figure of 11,736 tons is the weekly output of some nine-tenths of the firms in the north-east.[5] There is not sufficient detail to support a claim that the growth of the finished iron trade was even more swift than that of the pig trade, but there was clearly a rapid increase of both.

III

The necessary labour for the new ironworks on the north-east coast could not be found locally, but the above figures suggest that the growth of output could not have been seriously hampered through any difficulty in getting men to move from other parts of the country. In fact, there was a large movement of both skilled and unskilled labour. The effect of this movement on labour relations in the industry has been described by Henry Crompton in *Industrial Conciliation*, pp. 54–5, and in more detail by William Whitwell, President of the Board of Conciliation and Arbitration for the Manufactured Iron Trade of the North of England from 1875, in evidence before the Royal Commission on Labour in 1892. There Whitwell said that skilled men came from ironworks in Wales, Staffordshire, and Lancashire, while labourers came from agriculture, quarrying, mining, and

[1] Lowthian Bell, *Iron Trade of the United Kingdom*, p. 18.
[2] Griffiths, op. cit., p. 123.
[3] Griffiths, op. cit., p. 315, table giving output of English firms north of the Humber.
[4] Calculated from Griffiths, op. cit., p. 119.
[5] Bell, op. cit., p. 18.

other industries.[1] Crompton mentioned that a considerable number were Irish. Discipline was bad, for there were few ties of friendship, locality, or service, the men being 'strangers to their employers as well as to each other'.[2] The result was that the fluctuations of trade and of earnings which were so common in the iron trade at that time led to a series of disputes in which the men grew suspicious and the masters showed little sign of understanding their difficulties.

Whitwell, Crompton, and L. L. Price (in *Industrial Peace*) all mentioned the fact that at this time most of the men were uneducated and were very lacking in knowledge of their new trade. Crompton commented that he found no sign of 'superiority like that respecting some of the coal-miners'.[3] The labour was muscular rather than mental, and intelligence was not considered necessary for most of the tasks in a works. Thus the men could hardly be expected to understand the fluctuating nature of the demand for iron. Furthermore, according to Sir Bernard Samuelson, most of them now enjoyed 'higher wages than those to which they had been accustomed', and seemed determined not to allow them to be reduced.[3]

The result was that during the period of bad trade in 1864–6 there was a series of disputes, 'and the whole district appeared to have been given over to disputes and demoralisation'.[4] This culminated in a 5 or 6 months' stoppage in 1866; the trouble began at one firm in Darlington where the men claimed an increase in wages. This was at a time when American demand for rails was temporarily low and when investment demand at home was being weakened by scarcity of money and fear of war in Europe. The price of rolled bars at Middlesbrough was falling steadily,[5] so the owners refused the increase and demanded a reduction. This, in turn, was refused by the men, and they were promptly locked out. Soon the whole district was involved, and a strike was declared which lasted over 4 months. In the end the union, which was only about 3 years old, was almost destroyed and the owners succeeded in obtaining a reduction in wages. Prices continued to fall and further cuts were made in the next

[1] *Royal Commission on Labour*, Group A, Questions 14,978, 14,988–93. This commission, which covered all industries, was divided into three groups, each of which dealt with several industries. Group A, under the chairmanship of Mr. David Dale, inquired into mining, iron, engineering, hardware, shipbuilding, and cognate trades.

[2] H. Crompton, *Industrial Conciliation*, p. 54.

[3] Quoted by Whitwell before the *Royal Commission on Labour* (Group A, Question 14,978) from a paper read by Sir Bernard Samuelson before the first meeting of the British Iron Trade Association in 1876.

[4] J. S. Jeans, *Conciliation and Arbitration*, p. 88.

[5]

	1864	*1865*	*1866*	*1868*
Average price per ton:	158*s.* 10*d.*	153*s.* 2*d.*	147*s.* 2*d.*	127*s.* 3*d.*

From Lowthian Bell, op. cit., p. 132.

2 years. These caused bitter resentment, but no strikes, as the union was in no condition to fight.

IV

Such was the position in 1866. Yet, as will be shown in this section, 3 years later a Board of Conciliation was formed. As Mr. Hicks has shown[1] the first industrial boards had concentrated on arbitration and it was not until 1860 that the first conciliation board proper was formed, in the hosiery trade of Nottingham. Mr. A. J. Mundella, an employer in the trade, was mainly responsible for the formation of the board, which served as an example for the iron trade and others.

The Hosiery Board was self-contained in that Mundella was made chairman with a casting vote. At first he used this vote whenever the parties failed to agree, but he found that the casting vote got them into trouble,[2] so from 1864 the board members decided that the vote should not be used, and the board became effectively a conciliation board only. About 1865 a Committee of Inquiry consisting of two employers and two operatives was created to settle disputes without reference to the board. It had no power to enforce awards, but its advice was usually followed.

This board was followed by one or two others. In particular, the Nottingham lace trade formed a board with a referee from outside the trade in Henry Crompton, and in 1868 a board was created in the pottery trade of Staffordshire. In the following year came the best known of these early boards, that of the North of England Iron Trade.

In its early years this board had to face one or two brief sectional strikes, including one of 12 days' duration in 1882, but even such strikes were rare, and never again did the iron industry of the north-east face anything comparable with the protracted struggles which were so common in the iron and coal industries at that time. Moreover, the board was partly responsible for improved industrial relations in other iron manufacturing areas, since several employers in Cumberland, west Scotland, and south Yorkshire, though not members of the board, followed its decisions on wages and working conditions and thus greatly reduced friction in their works. This remarkable change in industrial relations was brought about by the efforts of a small number of employers and unionists, and most of all by the work of Mr. (later Sir) David Dale of Darlington, a director of the Consett Iron Company.[3]

[1] 'The Early History of Industrial Conciliation in England', *Economica*, March 1930.

[2] *Royal Commission on Trades Unions*, 1868, Question 19,348.

[3] Dale, a great-nephew of the David Dale who was Robert Owen's father-in-law, was brought up in Darlington. While on a trip to New Lanark shortly after the death of Dale's father his mother's coach had broken down at Darlington. Her short stay there was made so pleasant by the kindliness of the local Quakers that she later returned and settled there. She became a Friend in 1841, and her son was apparently brought up in the sect. Dale became a clerk in the Wear Valley Railway Company in 1846, at the age of 17; secretary

Dale was a Quaker and was therefore interested in industrial peace for its own sake. In a paper which he read to the Leeds Industrial Conference in 1899[1] he told of attending meetings of the Associated Chambers of Commerce in 1865, 1866, and 1867, and of hearing Mr. Whitwell—the M.P. for Kendal—and Mr. A. J. Mundella describe how conciliation was employed in the carpet and hosiery trades respectively. He was 'especially impressed by Mr. Mundella's clear description and earnest commendation of the conciliation system established by him in the Hosiery and Glove Trades of Nottingham, Derby and North Leicestershire'. Dale added that his early guidance as to how conciliation could be made effective was from Mundella, while his later 'clearer views of procedure' were due to Sir Rupert Kettle.[2]

Dale decided that some form of conciliation might be valuable in the iron trade. In February 1867 he moved and saw carried at the London meeting of the Associated Chambers of Commerce a resolution affirming 'the desirability of establishing Courts of Conciliation for the settlement of disputes between Masters and their employees'.[3] In March of the following year, when he was Honorary Secretary of the Iron Manufacturers' Association, he sent a letter to each member of the association inviting them to consider the establishment of a 'Standing Local Committee' of employers and men to discuss 'questions affecting their mutual relations'.[3]

The first attempt was welcomed by a few of the masters, including Mr. Whitwell (nephew of the M.P. for Kendal) and the Bell brothers, but most, according to Dale, were not enthusiastic. So, to quote his paper again, Dale's suggestions 'stood over for nearly a year, whilst the educational process was going on'.[4] It seems, however, that the masters' attitude was partly one of caution and not entirely opposition, for a meeting of the Masters' Association on 7 April 1868 appointed a committee to study methods employed in other industries and prepare a scheme for the iron trade. The committee apparently did its work very thoroughly, for it did not report until January 1869, when it recommended that a 'Local

of a section of the Stockton and Darlington Railway at 20; partner in a locomotive works for a time; and an inspector of the closed Consett Works of the Derwent Iron Company in 1858. This firm had been forced to close its three works after the failure of a local bank. These works were bought over in 1864 by the newly formed Consett Iron Company and Dale was made a director. He became Managing Director in 1869 and Chairman in 1884. He also became managing partner in J. W. Pease & Company and had financial interests in shipbuilding and coal and iron mines. A short account of his life is given by Howard Pease in a preface to Sir Edward Grey's Inaugural Address for the David Dale Trust.

[1] *Thirty Years of Industrial Conciliation and Arbitration.*

[2] Dale, op. cit., p. 2.

[3] Ibid., see also Jeans, op. cit., pp. 88–90, where the communication is given verbatim.

[4] Dale, op. cit., and Howard Pease in his Preface to Grey's Inaugural Address for the David Dale Trust.

Standing Committee of Masters and Men directly associated with Ironworks' should be appointed if the men were in favour of it.[1]

Dale's success in converting the masters was aided by several factors. First was the high capital cost of an ironworks of any size—and according to Jeans the iron firms in the north-east of England averaged about 430 workers in 1869[2]—which meant that strikes and lock-outs were very costly. In evidence before the Labour Commission Edward Trow, General Secretary of the Association of Iron and Steel Workers, spoke of a firm in 1876 where a few men refused to carry out the orders of the board. The trouble was over in a few days but the loss to the firm was £678. 10*s*.[3] The expense of disputes was increased, as Crompton pointed out,[4] by the close connexion between various tasks which meant that a strike in one part of the works often slowed or even stopped operations elsewhere.

The second reason for the acceptance of Dale's suggestion by the employers was best put by Sir Bernard Samuelson in his paper before the first meeting of the British Iron Trade Association in 1876.[5] The reduction of wages in 1866–8 had made the men resentful and 'rendered it more than probable that any considerable increase in the demand for iron would be the signal for peremptory demands on the part of the workmen, tending to a renewal of the confusion of previous years, and to the destruction of the prosperity which all might otherwise hope to share'. The increase of demand came in 1869, and future business prospects looked good, if strikes could be prevented. The future, therefore, seemed to depend on whether the men would support a Local Standing Committee or not.

Fortunately Dale had not only suggested conciliation to the employers, he had discussed it with the men's leaders, John Kane and Edward Trow, and they had been explaining the advantages of conciliation to their followers for some years.

Kane had started work at a Gateshead ironworks in 1834 and had tried for many years to form a union. He succeeded in 1863, but lost his job of roller for 'defending the Leeds and Low Moor men when locked out'.[6] He told the Trades Unions Commission in 1867 that he had since lived on his £140 per year as President of the Association of Ironworkers.[7]

[1] Howard Pease, op. cit., p. 38.
[2] J. S. Jeans, op. cit., pp. 91–2.
[3] *Royal Commission on Labour*, Group A, Questions 15,159–60.
[4] Crompton, op. cit., p. 55.
[5] Quoted by Whitwell before the *Royal Commission on Labour*, Group A, Question 14,978.
[6] *Royal Commission on Trades Unions*, Fifth Report, Question 8,208.
[7] This may seem large for the president of a small union at that time, but both wages and union subscriptions were quite high. Kane told the Trades Unions Commission (Questions 8,219–25) that in 1865–6, a year of poor trade, 5,000 men paid £6,000 in dues. This income fell to £1,000 in the following year, as a result of the long strike and of the trade depression which reduced wages and caused much unemployment. The union revived slowly and in 1868 was reorganized nationally. According to the Webbs' *History of Trade Unionism*, p. 240 n., Kane then became general secretary. He died in 1876, and was succeeded by Trow.

Dale was aware of the advantages of a strong union if arbitration were to be effective, and he seems to have persuaded the employers to accept the men's selection of Kane as their Secretary to the Conciliation Board when it was founded in 1869. Kane had certainly not been popular with the owners a few years earlier. During the strike of 1866, which he led, the owners had refused his request for arbitration, and in December 1867 they had turned down his request for a general conference of masters and men, but 18 months later they raised no objection to his being appointed Operatives' Secretary to the board.

Kane, then, had been in favour of a conference in 1867, but not all his men were sure of the benefits of conciliation. Late the following year a strike was threatened, but some of the workers decided to pay a visit to Nottingham to inspect Mr. Mundella's conciliation boards. This was apparently at Dale's instigation.[1] The report on the Nottingham boards was favourable, and in February 1869, a few weeks after the committee set up by the employers had recommended the creation of a Local Standing Committee if the men were in favour, and while this recommendation was still being considered by the employers, the men of several works sent an official communication to the employers asking for 'a Board of Arbitration constituted and arranged on Mr. Mundella's scheme'.[2] A conference was held between employers and men on 1 March 1869; the men were still a little suspicious, possibly because of earlier rejections of Kane's requests for a conference, or because of his dismissal for union activities, for they demanded 'personal guarantees that we shall not be interfered with, deprived of our labour, or made marked men, like others have been beforetime'.[3] This guarantee was given by the employers.

Several meetings, at which Dale presided, were held, and at the final meeting of 22 March 1869 'The Board of Arbitration and Conciliation for the Manufactured Iron Trade of the North of England' was born, and Dale was elected the first president of the board.

V

This was a very great achievement. Clapham refers to it as 'something of a feat'.[4] L. L. Price goes into great detail about the fluctuating prices and uncertainties of future demand.[5] They both emphasize the youthfulness of the industry, which according to Clapham was 'without traditions and without regular unionism', and the ignorance of the men who were 'without much book learning or very long experience'. Price quotes from various arbitration awards, where workers' representatives' opinions of

[1] J. R. Hicks, *Economica*, March 1930, p. 36.
[2] Dale, op. cit., p. 2.
[3] J. S. Jeans, op. cit., p. 90.
[4] *Economic History of Modern Britain*, vol. ii, p. 175.
[5] *Industrial Peace*, pp. 18–27.

puddlers are given, to show that puddlers as a class were 'not very intelligent'. All this is looked on as increasing the difficulty of forming any sort of permanent board between masters and men. Yet even if we accept this as a correct judgement of the men's ability (and the evidence of the employers to the Royal Commission on Labour 1892 suggests that, even if the men were stupid in 1866, their ability to bargain, and the ability of their representatives to study prices and form opinions, grew rapidly in the next few decades), it is not necessarily true that a youthful industry and an ignorant crowd of workers is an enormous handicap to good industrial relations. It seems reasonable to claim that this is the very breeding-ground for a joint board, if there exists an employer of strong character, great persuasive powers, and clear-mindedness. Such a man was David Dale, as his chairmanship of Group A of the Royal Commission shows. Dale also had the integrity which enabled the board to prosper once it was created.

The fact that the industry was young with no traditions or regular unionism, and that the men lacked long experience, meant that Dale's persuasiveness was not met by the deep resentment and prejudice which is caused by decades of industrial unrest. It is true that the men were at first suspicious of the owners and demanded the guarantee which has been quoted above, but once the promise of no victimization was given they seem to have co-operated willingly. The union man with a grudge—common enough in other industries, as again the Labour Commission shows—could hardly be common in the iron industry of the north-east where the first union was not formed until 1863. Many of the owners were quite new to industry also, and could not have learnt to hate the sight of a union card. Dale himself had not been connected with the iron industry until 1858.

It seems probable, therefore, that both sides would be more receptive of Dale's ideas than if there had been a long history of strikes and lock-outs in the industry. This argument is not refuted by Whitwell's statement to the Labour Commission (Group A, Questions 14,988–92) that skilled iron-workers came from other areas and labourers from other trades, for the trade was growing so rapidly that it would have been quite impossible to get enough skilled men from other districts. Many men new to the trade would soon be training for skilled jobs. The speed of promotion in such a rapidly expanding trade would also help to improve relations. Finally, even the skilled man with memories of strikes in other areas was making a fresh start amid new surroundings and under different employers. This would surely help to reduce any bitterness felt towards those in authority.

As was mentioned in section IV, Dale made one very enlightened move,

perhaps encouraged by knowledge of Mundella's comment in evidence before the Trades Unions Commission in 1868, that the board in the hosiery industry 'could have done nothing without the organization of the union'.[1] The move was to encourage the other owners to recognize the union and to accept John Kane—the Union Secretary—as the men's chief representative on the board, despite the fact that he was no longer employed in the industry. Evidence given before the Labour Commission showed that even in the 1890's many masters in other trades were still objecting to meeting unionists who were not members of their own industry, and often of their own firm. In his address at Leeds, Dale outlined typical attitudes adopted by the masters, and commented that the refusal to meet men who were outside the trade made good relations much more difficult to achieve. His own opinion was that large unions obviously needed full-time officials.[2]

At first Dale had found difficulty in persuading employers to accept the justification of a union at all, but he found that in his own trade the owners gradually realized the advantages of treating with the men as a class and of varying their wages and conditions together as trade varied. They also came to accept Dale's belief that unions had their useful and necessary side in helping to enforce the observance of awards and wage contracts. Dale's attitude may have helped the revival of the union after 1866. Certainly once the board was formed, the employers came to realize that a strong union was essential to ensure that the awards were carried out, and this further strengthened the union. By 1873 it had a country-wide membership of 35,000. The succeeding years of bad trade greatly reduced its membership and in 1879 it had only 1,400 members, mainly in the north of England. After that it began to grow again, although the fact that by then the manufacture of iron was a declining industry prevented its regaining its former size. By 1892 it had about 10,000 members in south Yorkshire, north and south Staffordshire, east Worcestershire, west Cumberland, and the north of England, but its main strength still remained in the north.

After 30 years' experience of this union and of the board, Dale believed that 'the best security employers can have for the rule of reason and the observance of engagement on the part of the operatives belonging to any trade union, is that that union should have an able and thoroughly trusted executive'.[3] He added that the chance of its having reasonable officers was increased if the union were recognized by employers and public opinion.

VI

The next problem to be discussed is why, despite the employers' acceptance of Kane as Operatives' Secretary, the rules of the board made

[1] Question 19,368. [2] Dale, op. cit., p. 6. [3] Ibid., p. 4.

no reference to the existence of any union, and why the rules were not modified in later years when there were few non-unionists in firms represented by the board.

According to the rules, negotiations were to be between 'employers' and 'operatives', and although the men elected union officials to represent them, they were not appointed to the board as such. Ashley suggested that this was because when the board was created 'unionism was only beginning to obtain respectful treatment'.[1] It seems possible that the employers, though willing to have unionists on the board, wanted both unionists and non-unionists to help elect their representatives, so that the union was not officially in control of the men's side of the board.

There is also the fact that when the board was founded the union, although growing, may not have been large enough to enforce decisions made by associated employers negotiating directly with the union. This difficulty was encountered in the south Staffordshire manufactured iron trade, where an informal board was formed in 1872.[2] This board consisted of twelve employers chosen by the Employers' Association and twelve operatives chosen by the Ironworkers' Association. The non-unionists, who seem to have been numerous at that time, refused to obey the board's awards, and the union had no means of stopping them. The board failed, therefore, in 1875.[3] The employers offered to form a new board in the following year, and the men agreed providing it was 'as nearly as possible on the lines of the Board which they had in the North of England'.[4] So in 1876 there was formed the 'South Staffordshire Mill and Forge Wages Board' on formal lines, with a president from outside the trade, and with a set of printed rules. The operatives of each firm elected a representative from amongst themselves in the same way as in the north of England.

It is quite easy to understand, then, why in the early years of these formal boards the masters would not negotiate directly with the union. The same reasons could hardly be said to apply 30 years later, yet as Ashley showed,[5] the rules of the boards still did not mention the union in 1903. By then the associated employers fully recognized the great help that the union gave in ensuring that the decisions of the boards were obeyed.

[1] W. J. Ashley, *Adjustment of Wages* (1903), p. 145.

[2] This was the first board to be created in the iron industry after the foundation of the North of England Board.

[3] This board had no president, no title, and no rules, and its very informality may well have contributed to its lack of authority.

[4] This unsolicited testimonial occurs in a reply to the Labour Commission by Aucott, Operatives' Secretary to the board. The pages of the Commission's Minutes of Evidence contain further proof that ironworkers in other areas held the Northern Board in high esteem. See, for example, Cronin's comment, Group A, Question 15,938.

[5] Ashley, op. cit., pp. 144–5.

Moreover, 10 years before, Trow claimed that there were few non-unionists left in the firms associated with the boards,[1] although there were several unions of enginemen, cranemen, labourers, &c.

In a lecture at Birmingham University in 1902,[2] Mr. Daniel Jones, Secretary of the South Staffordshire Ironmasters' Association, and Employers' Secretary to the Midland Wages Board,[3] explained why that board still did not recognize unions for the purpose of negotiations about wages and conditions of labour. He said that the union was 'essential to the working of a Wages Board' and that the midland iron-manufacturers encouraged their operatives to belong to the union, but that each employee still had to belong to the board as a worker, not as a unionist. If unions were recognized for purposes of negotiation, and their secretaries appointed directly to the board, each union would act solely in its own interests, these interests would clash, and the result would be strife.

Jones added that attempts had been made, especially in the north of England, 'to engraft these subordinate associations upon the parent Board'. He was probably not referring to Trow's Association of Iron and Steel Workers,[4] but to the small unions of craftsmen, maintenance men, and ancillary workers, for he had remarked earlier in the lecture that the board was not to be 'the instrument of several other organisations, as, for instance, boiler-makers, engine and cranemen or whatnot'.

This suggests, then, that it was the existence of numerous small unions which made direct union representation on the board undesirable.

Group A of the Labour Commission questioned the General Secretary of one small union—John Whitburn of the Enginemen, Firemen and Boilermen's Amalgamated Society, which had been formed in Middlesbrough in November 1889. This union was seeking to enrol all enginemen, &c., in all industries, but had so far achieved a membership of only 4,000. Whitburn claimed that the Cleveland ironmasters, i.e. the makers of pig-iron, had consistently refused to deal with his society,[5] although he later admitted, when questioned by Trow, that the latter was probably right in suggesting that the trouble was mainly between the Enginemen's Society and the Association of Blastfurnacemen, and that the masters had understood that the Blastfurnacemen's Union represented the enginemen as well as the other workers, as, in fact, they always had done previously.[6]

In evidence before the same commission Hugh Bell, ironmaster, said

[1] *Royal Commission on Labour*, Group A, Question 15,394.

[2] Reprinted in W. J. Ashley, *British Industries*, see especially pp. 46–7.

[3] The South Staffordshire Mill and Forge Board changed its name to the Midland Iron and Steel Wages Board in 1886.

[4] This was the name adopted by the Ironworkers' Association in 1887. It did, in fact, contain some steel workers, but its main strength remained in the iron trade.

[5] *Royal Commission on Labour*, Group A, Questions 17,323–4.

[6] Ibid., 17,454–7.

that in 1891 a joint committee of owners and blast-furnacemen, including some enginemen, had renewed the blast-furnacemen's sliding scale of wages based on the price of pig-iron. Some months later the new Enginemen's Society refused to accept a reduction of wages under the scale, claimed that the scale did not apply to them, and threatened a strike. They were forced to accept the reduction, however, as they had members only at three or four of the works covered by the agreement,[1] and even there the rest of the men refused to support them. Bell thought that the previous good relations with the men would be at an end if 'every small class of men claimed to be represented by a separate association and dealt with separately'.[2]

Dale's opinion on this problem emerges from his questioning of Whitburn.[3] Dale suggested that 'it would hardly be possible to have an associated body of employers with whom you (i.e. Whitburn's union) could deal, because those employers would have to be persons carrying on very varying industries all over the country'. Whitburn replied that both the engineers and the joiners had unions with members in many trades, but they still managed to negotiate with associated employers and settle disputes.

Dale then ascertained that the members of Whitburn's union worked for dock companies, ironmasters, iron manufacturers, mine owners, and engineers, and commented that these bodies had nothing in common except the employment of a few men of the same trade. He dismissed the possibility of such a union ever negotiating with employers' associations, and did not seem to believe one union could successfully negotiate separately with different groups of employers. He apparently believed that the future trend was towards industrial unionism.[4]

Mr. Jones's lecture and the evidence given before the Labour Commission throw much light on the problem of why the iron manufacturers of the north-east and the midlands continued their policy of not dealing with unions on the Conciliation Boards. It seems clear that the owners, though recognizing the value of unions, feared that if one union was recognized the others would not rest content until they were recognized too. If all were recognized for negotiations there would be trouble and

[1] *Royal Commission on Labour*, Group A, 14,606.
[2] Ibid., 14,529–31. [3] Ibid., 17,312–22.
[4] Dale was wrong, but it is notable that there are now only two production unions peculiar to iron and steel, the I.S.T.C. and the Blastfurnacemen. The N.U.G.M.W. has some production and ancillary workers, mainly in Sheffield, but most of these grades, including crane-drivers, &c., are in the I.S.T.C. Dale could not have foreseen the great increase in the proportion of maintenance to process workers which has enabled the employers' association to negotiate with the various national craft unions in the way which he evidently thought unworkable. At the same time, negotiations with the production workers are usually simpler and, on the whole, employers find that disputes with these men are rarer and usually more quickly settled than are disputes with the various maintenance trades.

jealousy between the unions. In effect, as Dale was well aware, at least by 1892, to recognize no union at all meant that the board was dominated on the operatives' side by the strongest union in the industry. Small unions were ignored by the owners, and had to negotiate through the operatives' secretary, who also happened to be the big union's secretary. Thus the refusal to recognize unions for negotiating purposes may, as Ashley believed, have begun simply because unions were not regarded as respectable. It continued because it meant that the boards were stronger, the main union was encouraged to grow, and squabbling between unions—not unknown in some industries today—was largely avoided.

The scope for the small union in any area covered by a Conciliation Board was in the specialized crafts, and in trades which were common to several industries, so that the men did not feel any particular affinity with the actual iron-workers. Amongst puddlers, heaters, shinglers, shearers, and their helpers there was no great pressure to form breakaway unions because there was no hope of getting one's man elected to the board. Election of a non-unionist (or of a man who did not belong to the Iron-workers' Union) had apparently never occurred up to 1892, for Trow in evidence before the Labour Commission[1] seemed hardly able to believe his ears when asked what would happen if one were elected. He said, 'The members would not elect him.' And when asked what would happen if a certain works were non-union and appointed a non-unionist to the board, he replied: 'When that difficulty crops up we will deal with it.' One feels that they certainly would! Apart from the insight into Trow's character that this yields, these remarks show that there were no non-unionist works belonging to the board. Furthermore, Trow did not refer to any early days when non-unionists were elected, so it seems that the men had elected union members as their representatives from the start. That Trow's union were aware of the advantages of non-recognition by the boards is suggested by the fact that none of the members who gave evidence before the Royal Commission on Labour protested against this non-recognition.

VII

The above shows that one important fact which emerges from a study of the rules of the Board of Conciliation and Arbitration for the Manufactured Iron[2] Trade of the North of England is that officially the operative from each works came to the board not as a unionist but as an elected representative. In these two final sections, after summarizing the other rules of the board, we have to consider just whom he represented.

[1] *Royal Commission on Labour*, Group A, Questions 15,393–402.

[2] The words 'and Steel' were later added, but, in fact, few steelmakers seem ever to have come under the board, although its advice and assistance were available when required by any steel firm seeking to set up a joint committee between its management and workers.

First, however, the rules, which are printed in Appendix 27 of the Minutes of Evidence given before Group A of the Labour Commission. These rules were based in part on those of Mundella's Hosiery Board.

The board was to consist of one employers' representative and one operatives' representative from each member-works, and the operative members were to ballot for their men each December. The board was to meet each January and July, and whenever required to consider a dispute referred to it by its Standing Committee. Each January the board was to elect its president (an employer), its vice-president (an operative), two secretaries, one the employers' and the other the operatives', two auditors, and two treasurers. A Standing Committee was also to be appointed, to consist of the president and vice-president and five members from each side of the board. The employers picked ten of their number to ensure that five would be available at short notice—a minor point indicative of the thoroughness by which difficulties were avoided from the start. As described to the Royal Commission on Labour,[1] the board as a whole dealt with general questions relating to changes in trade conditions, while the Standing Committee settled local disputes arising from some problem at a single works. The procedure for dealing with these small disputes was carefully laid down in the *Instructions* which followed the printed rules of the Board.[2]

For the larger disputes, with which the Board of Conciliation dealt, the rules allowed an independent referee or arbitrator to be called. His

[1] Group A, Questions 15,255–68.

[2] These instructions began: 'If any subscriber to the Board desire to have its assistance in redressing any grievance, he must explain the matter to the operative representative of the works at which he is employed. Before doing so he must, however, have done his best to get his grievance righted by seeing his foreman or the manager himself.'

'The operative representative must question the complainant about the matter and discourage complaints which do not appear to be well founded. Before taking action he must ascertain that the previous instruction has been complied with.'

The instructions went on to explain that if the grounds seemed reasonable the representative would return with the man to the foreman or whoever customarily heard complaints. Most complaints would be settled on the spot. If not, the employers' and operatives' representatives had to sign a statement of the points of difference which would be sent to the board secretaries with a request for the committee to meet. This meeting would be held as soon as possible after 7 days. The instructions added: 'It is not, however, always possible to avoid some delay, and the complainant must not suppose that he will necessarily lose anything by having to wait, as any recommendation of the Standing Committee, or any decision of the Board may be made to date back to the time of the complaint being sent in.'

'Above all, the Board would impress upon its subscribers that *there must be no strike or suspension of work*. The main object of the Board is to prevent anything of this sort, and if any strike or suspension of work take place, the Board will refuse to inquire into the matter in dispute till work is resumed and the fact of its having been interrupted will be taken into account in considering the question.'

Finally, the instructions recommended that notice be given, and, if possible, prior arrangement made of any modification of work which would involve different hours or earnings. This was to ensure as far as possible that the men were given warning of changes, to remove uncertainties about rates of earnings, &c., and so to prevent the sort of dissatisfaction which, even if it caused no immediate dispute, might rankle and lead indirectly to a strike.

decision was to be final and binding. In the 4 years after Dale's resignation from presidency of the board in 1875 he was appointed at least four times as general arbitrator to his own trade.[1]

Previous to 1883 problems not solved by the Standing Committee were referred to the board. In that year the rules were changed to permit a referee to be appointed and to vote if there were an equal division of opinion in the committee. Dale was unanimously elected referee, and, as Whitwell told the Commission on Labour, was re-elected each year.[2] At the same time, the rules were also modified to make it possible for Dale to preside over the board and to act as arbitrator if it were desirable and if a majority of the board agreed. This in itself is sufficient proof of Dale's integrity and a part, at least, of the reason for the board's success.

Other rules covered procedure, authority, and expenses. Voting was by hand, unless a ballot was called for. In the absence of one member, the other representative of the same works was not allowed to vote. Each representative was fully authorized to act for his works and each works was fully bound by board decisions. Expenses were shared equally. The employers collected the dues of their subscribing members (by deducting them from their pay), and each firm doubled the total received from its own workers. At first the levy was one penny a month from all men earning 2*s*. 6*d*. a day or more 'who may not send in any objection to such deduction'.[3] Appendix xxvii to the Minutes of Evidence before Group A of the Royal Commission on Labour shows that some time before 1892 this rule had been amended to read: 'The sum of one penny per head per fortnight shall be deducted from the wages of each operative earning 2*s*. 6*d*. per day and upwards.' There was then no mention of any possibility of contracting out.

Representatives who attended committee meetings received 10*s*. and second-class rail fare.

Great care seems to have been taken to avoid any appearance of class distinction. George Howell has commented wisely that 'the one essential condition to a system of arbitration is the recognition of equality of rights as between the parties'.[4] An examination of the formal rules of the North of England Board shows that those who drew them up had already grasped this fundamental principle of industrial relations. A study of the

[1] Dale was succeeded as president by William Whitwell, one of the first employers to be favourably impressed by Dale's suggestion of 'Courts of Conciliation'.

[2] Mr. J. S. Jeans, who at various times was Secretary to the Iron and Steel Institute, Secretary of the British Iron Trade Association, and Editor of the *Iron and Coal Trades Review*, and who knew most of the manufacturers personally, commented that it was usually better not to have an employer as umpire, but added, 'Mr. Dale's is altogether an exceptional case, as he is also an entirely exceptional man' (*Conciliation and Arbitration in Labour Disputes*, p. 33).

[3] Ibid., p. 91.

[4] G. Howell, *Labour Legislation, Labour Movements, and Labour Leaders*, p. 440.

ensuing history of the board shows that the rules were interpreted as they were intended.

VIII

In *Industrial Democracy* the Webbs criticized previous writers for discussing 'the formal rather than the real constitution'[1] of the Conciliation Boards in the iron trade. This is a little unfair, for writers such as Crompton and Price wrote chiefly of the North of England Board, and while some of the later boards in the iron, steel, and coal trades failed to follow their rules carefully,[2] the rules and instructions of the pioneer board give a good idea of its real constitution and real aims.

The Webbs were also worried because no one had tried to show what classes of workers took part in electing their representatives, nor how well the different grades were represented. Furthermore, as the Webbs pointed out, some types of workers employed subordinate labour. By 1920 the Webbs had made up their minds that subordinate labour was 'usually outside the Union' and had no 'direct representation on the Board'.[3] Unfortunately they do not give their grounds for this belief, and W. J. Ashley's *Adjustment of Wages*, which the Webbs recommended for its 'careful statement of the facts as to these Wage Boards', does not mention the problem of whether subordinate labour (or contract labour as it was usually called) was represented directly on the board.

My own opinion is that, in the North of England Manufactured Iron Trade, the contract labour had no vote in the election of representatives, but that all the other workmen had.

The reasons for this belief will be discussed shortly, but first it seems more important to consider the fuller implications of the Webbs' remarks. Briefly, they seem to imply a belief that the boards were organized for the benefit of the employers and the relatively small number of sub-contractors, and were prejudicial to the interests both of the contract labour hired by the puddlers, mill furnacemen, rollers and shearmen, and of the ancillary tradesmen—mechanics, enginemen, and cranemen, &c., who were hired directly by the firm but were not themselves employers of labour.

The final task of this paper is to try to decide whether, in the case of the North of England Board, this belief of the Webbs is justified or not. This means a discussion, not only of who had a vote, but of whether some voters may have had no hope of seeing their choice elected. It is also necessary to know who had the right to take their grievances to the Standing Committee, and whether all who could complain received equal treatment.

[1] *Industrial Democracy*, p. 205 n.

[2] On this point, see the evidence of John Cronin of the Scottish Millmen's Union before Group A of the Labour Commission, especially Questions 15,938–59.

[3] *History of Trade Unionism*, 1920 Edition, p. 735.

First, the problem of voting. As mentioned above, the Webbs claimed that it was not clear who had a vote. This does not seem true for the North of England Board, for rule 5 stated that, 'the operatives of each works shall elect a representative by ballot' at a meeting each December. It is true that this does not say *all* operatives, but the committee appointed by the Employers' Association in 1868 to prepare a conciliation scheme recommended a 'Local Standing Committee of Masters and men *directly associated* with ironworks'.[1] The inference is that the masters intended to create a board on which all men hired by the firm were represented, but the contract labour was not. We do not know if the recommendation was accepted as it stood, but the wording of rule 5 suggests it was.

Rule 19 allowed a deduction of one penny per fortnight from the wages of all operatives earning 2*s*. 6*d*. per day and upwards. I believe it most unlikely that a man would submit to this deduction unless he had a vote. In 1876 there were 13,000 subscribers in 35 firms, but, according to Crompton, 'large numbers of men are always connected with ironworks who do not subscribe, but are nevertheless dependent on its arrangements for employment, and who would be thrown out of work if a strike were to occur'.[2] The use of the words 'connected with' suggests that he was referring to contract labour.

It is on the above grounds that I believe that all men directly hired by the member-firms could vote in electing representatives to the board, but that the contract labour could not.

Next comes the problem of which workers could take grievances to the board. This is quite clear. Rule 19 said that all men earning over 2*s*. 6*d*. a day were subscribers, and Edward Trow told the Labour Commission that every subscriber had the right to state his case personally to a Standing Committee whose members had no personal connexion with the man's grievance.[3] Again it seems that only the contract labour was outside.

The fact that all subscribers could go before the committee does not prove that they all received equality of treatment. We have already seen from Trow's evidence that the operatives' side of the board was dominated by the Ironworkers' Union. Mr. Daniel Jones's lecture at Birmingham University showed that some of the smaller unions resented this and tried to get themselves represented as unions on the board. However, they do not seem to have been too badly treated, if we can accept the evidence of Mr. John Whitburn. He was the Secretary of the Enginemen, Firemen, and Boilermen's Society, whom we have already heard complaining to the

[1] Quoted by Howard Pease, op. cit., p. 38. (My italics.)
[2] Henry Crompton, op. cit., pp. 56–7.
[3] *Royal Commission on Labour*, Group A, Questions 15,280–4.

Labour Commission that the pig-iron makers ignored his union. Immediately after claiming that this refusal was the reason for the dispute which had occurred in that trade, he added: 'Very great credit is due to Mr. Trow for taking us in hand and working harmoniously with us through the Board of Arbitration in the Steel[1] Trade. We have, in those trades been able to arrange, and we hope to be able to arrange, many disputes that would otherwise terminate in a strike.'[2] This suggests that Trow's union was not trying to use the board exclusively for its own benefit, and that the enginemen, &c., received fair treatment.

This leaves only the problem of the contract labour. Their position is obscure. The Association of Iron and Steel Workers is known to have taken advantage several times of the disorganized state of their subordinate labour in order to pay them low wages. The best known case is of the situation in the Hawarden Bridge rolling mills of Messrs. John Summers & Sons Ltd. in 1910, where the termination of the contracts held by members of the union raised the earnings of their assistants by an average of between 25 and 30 per cent. and reduced their hours. Even so, not all members of the Iron and Steel Workers Association were in favour of the contract system. Two members, both steel workers, criticized the system to the Labour Commission, and the interesting point is that Trow himself reminded one of them of an incident at the Barrow Steel Works in 1886 when the abolition of sub-contracts in the Bessemer steel converting shops led to the firm saving 10 per cent. and the men earning 14 per cent. more.[3] There was no necessity for Trow to raise this matter, and the fact that he did implies that he cannot have been entirely opposed to abolition of contracts, which in turn means that he, at least, may not have regarded the board as for the sole advantage of his union.

Even so, it seems that contract labour neither voted in the election of representatives, nor was able to take grievances to the board. This is the one defect which mars the otherwise excellent record of the board. It is a serious defect, but its extent is reduced by the fact that in the iron industry the practice of sub-contracting became less and less common in the last two decades of the nineteenth century. Moreover, with or without a board, the disorganized contract labour could have been exploited, and like everyone else they benefited from the greater stability brought by the Board.

[1] This can refer only to the board of Conciliation and Arbitration in the Manufactured Iron and Steel Trades.

[2] *Royal Commission on Labour*, Group A, Question 17,324.

[3] Ibid., Questions 14,962–70.

NUFFIELD COLLEGE
OXFORD

TH

RECENT
centred
received
struggle
of the S
some de
of actua
the nois
reached
and of
pose of
referenc
stances

In N
gress in
to enac
order to
commit
before
Board.
Mr. Tru
the Res
stration
is not s
that all
Reserve
subsequ
issue, n
Snyder
the Fed
Federal
agreem
official
the sev

[1] M. S
the Boar
[2] Such
4520.3

THE MONETARY CONTROVERSY IN THE U.S.A.

By J. S. FFORDE

I

RECENT public controversy and official disagreement, in the U.S.A., centred round the U.S. Treasury and the Federal Reserve System, have received considerable publicity in this country. It is well known that this struggle has been going on with varying intensity since the closing stages of the Second World War, and that it was aggravated by the need to reach some decision as to what policy was to be followed in the current period of actual and anticipated inflationary dangers. Unfortunately, although the noise of a dispute, which came to be something of a political scandal, reached us easily enough, the question of what the struggle was about, and of who advocated what, has become rather indistinct. It is the purpose of this article to attempt some form of clarification of the issues by reference to an earlier phase of the struggle which took place in circumstances similar to those of the present.

In November 1947 Mr. Truman summoned the Republican 80th Congress into special session for the first time. The Congress was requested to enact legislation, which the Administration asserted was necessary, in order to combat the progress of inflation and safeguard American financial commitments to Europe and elsewhere. Among the various proposals laid before legislators was one (among others) made by the Federal Reserve Board. This proposal was not endorsed by the Administration, although Mr. Truman considered that Congress should give it careful study. (Since the Reserve System is a statutory authority, but not part of the Administration, there is nothing improper in the Board making a proposal which is not specifically endorsed by the Administration.) The Board proposed that all commercial banks should be required by law to hold a Secondary Reserve in the form of short-term government securities or cash. The subsequent controversy revealed complete disagreement on the point at issue, not only between Mr. Eccles,[1] Chairman of the Board, and Secretary Snyder of the Treasury, but between Mr. Eccles and President Sproul of the Federal Reserve Bank of New York, and between the Board and the Federal Advisory Council (representative of member banks).[2] This disagreement, made public in Congressional hearings, public speeches, and in official pronouncement by the authorities concerned, shows very clearly the several points of view, which are still relevant today.

[1] M. S. Eccles, Chairman of the Board of Governors of F.R. System, 1934–48; member of the Board of Governors of F.R. System, 1948–51.

[2] Such disagreement between the Council and the Board was not unusual.

There were three influential views. There was firstly what can be called a 'banking regulation policy' designed to offset the consequences of an officially supported market in government securities by the use of extended legal powers; this view was associated with the name of Mr. Eccles and is the one on which this article is based. There was secondly what can be called a 'market restraint policy', designed to use the peculiarities of the contemporary market in such a way as to restrain the expansion of credit without significant change in the cost of long-term Treasury borrowing; this second view was associated with the Reserve Bank of New York. There was thirdly that view which was opposed to direct controls over commercial banks while at the same time the usefulness of market restraint was belittled and any rise in the cost of long-term Treasury borrowing was also opposed; this view was associated with the U.S. Treasury.

It should be emphasized that these views only concerned the basic problem posed by official pegging of government securities at or around par[1] (in 1947, at or above par) in conditions of strong inflationary pressure. Such pegging, provided it was expected to continue, and the more so if no loss was incurred by selling at the pegged price, enormously enhanced the liquidity of government bond-holders. In so far as this encouraged the dumping of government securities, it was thought by some to aggravate inflationary forces to a degree that outweighed the financial strength which it gave at all times to lending institutions. But there was, and is, little or no disagreement in principle concerning the use of selective credit controls over stock-market margin requirements, consumer instalment credit, and, since September 1950, house-mortgage credit. Neither has there been marked disagreement over the use of certain expedients designed to place pressure on commercial-bank reserves or to cancel reserves created either by official market support or by gold imports—notably such expedients as the occasional raising of legal reserve requirements, and the use of surplus Treasury funds, either budgetary funds or the receipts of borrowing on non-marketable securities, in order to retire securities held by the Reserve System. Disagreement between the Treasury on the one hand and the Reserve System as a whole on the other concerning the appropriate level of short-term relatively to long-term rates, was, however, persistent, and often bitter, throughout 1945–1950. This was

[1] Since the great majority of U.S. marketable treasury bonds now outstanding were issued under a régime of low and rigidly stable interest rates during 1942–5, 'par' possessed peculiar significance, general declines below par involving all holders in paper capital losses and indicating a momentous change in official policy. If bond prices are known to be dependent on official policy, or their 'normal' prices are known to be so dependent, extreme *uncertainty* and, possibly, restrictive lending policies, may result from the infliction of capital losses which are small absolutely but large relatively to interest incomes in a period of cheap money.

due to the expansionary bias imparted to the whole credit system, over and above that due to the liquidity of nominally illiquid medium- or long-term bonds, by the periodic unwillingness of the public (banks included) to hold adequate quantities of the available *short-term* securities, yielding appreciably less than medium- or long-term bonds, when conditions of tolerable certainty regarding the future long-term rates existed. This unwillingness led to the dumping of floating debt on to the Federal Reserve or commercial banks, to a corresponding buying pressure on bonds, and to a further forcing of money into the economy regardless of proper credit demands. Various small changes in short-rates to higher levels than existed during the war, combined with a maximum of bluffing, were needed to offset this phenomenon, and the failure of the Treasury to appreciate the anxiety of the Reserve System concerning this and to permit rates to be changed quickly was a main cause of unfriendly relations.[1] This problem, though important, is to some extent subsidiary to the main one posed by officially supported ultra-cheap money which is to be considered in this article: the former, indeed, was temporarily solved, during the winter of 1947–8, by the rise in short-term rates that was allowed in the summer of 1947, and by the widespread fears, which existed at the time, that bond prices might fall below par. Bonds were heavily supported during that winter, for the first time since 1942, due severally to the technical consequences of higher short-rates, to the strength of credit demands, and to fears of a change in official policy, which combined to induce extreme weakness in the market. We shall, therefore, divert our attention to the Secondary Reserve controversy.

II

The Secondary Reserve proposals, which had their origin in the thinking of economists both inside and outside the System, were given sympathetic consideration in the Annual Report of the Board for 1945 and again, rather more positively, in the Report for 1946, which declared that 'action along these lines will be needed to rehabilitate the traditional instruments of Federal Reserve policy—open market operations, discount rates, and reserve requirements—and to assure a reasonable degree of financial stability in the future'. Legislative proposals, however, were not yet made. This sympathetic reaction of the Board to such suggestions found no counterpart in the views of President Sproul of the New York Reserve Bank as to the role of 'money management'. In a speech to the New Jersey State Bankers' Association on 6 December 1946 he said that 'so

[1] In September 1950 emphatic assertion of Federal Reserve independence of the Treasury was made on this issue, an assertion which, one may surmise, led to the capitulation of the Treasury over the 2½ per cent. issue in March 1951.

far as inflation is concerned, ours is essentially a holding operation'—a sharp contrast to the aims implicit in the remarks of the Board quoted above. Mr. Sproul went on to elaborate what this holding operation might be. He declared that although the movements of interest rates that could be considered feasible in the contemporary government-securities market were extremely small, nevertheless, it was equally obvious that the very considerations[1] which led to the restriction of official manœuvres pointed to a much greater sensitivity to small changes in rates than had hitherto been known. He attributed to 'money management only a very secondary role in meeting the major problems of to-day', but declared that it *was* important for such management to work in the right direction. The war-time 'pattern'[2] should be 'de-frosted' and the System permitted some initiative in the determination of rates. The advantages of regained initiative, which allowed the inculcation of 'uncertainty', would go some way towards the success of a holding operation which would restrain the monetization of the National Debt. Mr. Sproul saw no difficulties for the Treasury in a flexible short-term rate, neither did he object to the Treasury policy, current at that time, of refunding short. During the then period of debt reduction, given the fact that there were large institutional holdings of long-term marketables, he did not object to 'unfunding' of marketables provided the Treasury continued to push sales of non-marketable securities. Various types of Debt operations were appropriate to various conditions in the same way as credit policy. His idea was 'a modest approach to the restoration of credit control'. These views may conflict with those of the Treasury over short-term interest rates, but are not significantly in conflict with it over the desirability of cheap credit at all times. Mr. Sproul was not a 'restrictionist'.

Exponents of the Secondary Reserve, however, tended rather to dismiss the controversy about short-term rates as extremely irritating but of secondary importance. Mr. Eccles and others admitted, to the full, the weight of argument in favour of raising short-term rates and permitting the System some flexibility of action; they too desired to stop the bicycle-pump effects inherent in the war-time pattern of rates, but beyond that they wanted to help to *stop* inflation by restrictive credit measures designed to have their effect without spoiling the Treasury's market. It can be imagined that any form of direct regulation of credit would be acceptable to this school of thought provided the price of government

[1] Vital among which was fear of a panicky and disorderly market which would lead to drastically restrictive lending policies and a severe deflationary shock while also rendering management of the large, newly created National Debt extremely difficult.

[2] The pattern of interest rates, from ⅜ per cent. on bills to 2½ per cent. on 25-year bonds, under which the war had been financed, and whose illogicality had caused, in conjunction with Central Bank support, strong downward pressure upon long-term interest rates.

securities was unaffected and the regulation was administratively feasible. Extension of selective controls to cover the entire credit system was clearly neither administratively nor politically feasible in the U.S.A. The only way out was to turn the work over to the commercial banks, who would be at liberty to ration by price or otherwise, by means of saddling them with a sufficiently large legal supplementary reserve requirement to be held in the form of government securities or cash. In principle such a supplementary reserve can be made high enough to prevent further expansion of bank-loans, although sales of government securities by the public to the banks can continue. The proposals were thus of the nature of a 'monetary reform' and are themselves quite distinct from ordinary central banking method[1]—however much ordinary banking practice and ordinary market habits might be allowed to persist alongside the new arrangements. The state of mind behind such proposals cannot be one of disillusionment concerning the efficacy or desirability of orthodox monetary policy; on the contrary the proposals represent a return to it in an extremely drastic form. The state of mind simply recognizes, for one reason or another that 'orthodox' fluctuations in interest rates on government securities—thought to be an inevitable concomitant of any worthwhile degree of credit restriction—cannot be permitted. The reasons are those of solicitude for the balance sheets of financial institutions, for the interest burden on the budget, and for public confidence in the credit of the U.S. Government—the latter being necessarily impaired by any repetition of the events in the U.S. bond market which took place after the First World War. Secondary Reserves do not of themselves obliterate this last problem but are usually (now if not in 1947) put forward along with a suggested Debt Reform, abolishing the marketability of U.S. Treasury bonds and providing for pecuniary deterrents to encashment of the (substituted) non-marketable bonds prior to maturity. Once 'put across' it is hoped such securities would be firmly held at all times.

III

By midsummer 1947 the monetary authorities did begin, or at least a part of them did, to regard the policy of neutrality, the holding operation, as an inadequate discharge of their statutory responsibilities. This feeling was accentuated by the anticipated inadequacy of fiscal disinflation and by alarm at the pace of credit expansion. It led the Reserve Board, while continuing the holding operation, to adopt the Secondary Reserve more wholeheartedly. Chairman Eccles first publicly advocated some such general scheme, without giving details, in a statement to the Banking

[1] i.e. the method of influencing the credit situation by operating in a money market or a securities market.

and Currency Committee of the House, made in April 1947, entitled 'Methods of Restricting Monetisation of Public Debt by Banks'.[1] In this statement, as in a speech made to the New England Bank Managers' Conference six months before,[2] he distinguished between monetization that resulted from the anachronistic pattern of rates[3] and monetization of the more ordinary type, i.e. a simple unloading of securities on to the banking system by the public. This second type either involved non-bank liquidation of government securities or the expansion of bank loans and 'other' investments. In each case bank deposits expanded upon a credit base either enlarged at will by commercial banks, by the simple process of selling government securities to the System, or automatically enlarged by System support-purchases of securities sold by non-bank investors. Mr. Eccles granted the argument that the first type of debt monetization could be cured by raising short-term rates, but maintained that such a rise in rates would not achieve anything else. To restrict the second type, unless the whole 2½ per cent. position were to be abandoned, some such scheme as that recommended in the 1945 report would have to be considered. It alone would 'strike at the basic cause', namely the extreme liquidity of banks and public engendered by the growth in the National Debt and the maintenance of a stable and orderly market in that debt. In September 1947, in a speech to the National Association of Supervisors of State Banks,[4] Mr. Eccles showed some anxiety concerning the economy being 'caught fast in a serious wage-cost-price spiral' and concerning possible consequential effects upon the banking system. He admitted that the Reserve System could not, with existing powers and policies, effectively check the expansion of credit, but advised bank supervisors to encourage the maintenance of a high degree of liquidity, to discourage certain loans (real estate in particular) based upon inflated values, and to require an increase in the capital accounts of those banks whose risk assets were growing as a proportion of total assets. Government securities he did not regard as risk assets.

At last, in November, the special session of Congress was the occasion for outright proposal, by the Board, of Secondary Reserve legislation. Mr. Eccles gave evidence before the Joint Committee on the Economic Report, 25 November 1947[5] and filed a full description of the proposals, and their probable effects, with the House Banking and Currency Committee on 8 December.[6] The special session of Congress, and the hearings

[1] See *F.R. Bulletin*, 1947, p. 402.
[2] See *Ibid.*, 1946, p. 1230.
[3] The ⅜ per cent. Bill rate and ⅞ per cent. Certificate (12-month) rate were not abolished until later in the summer of 1947.
[4] See *Ibid.*, 1947, p. 1207.
[5] See *Ibid.*, p. 1455.
[6] See *Ibid.*, 1948, p. 14.

before its committees, enabled something of a public debate to be carried on concerning the problems of inflation in general and the Secondary Reserve proposals in particular. This debate, while clarifying the issues involved, did not do much more than highlight a range of disagreement amongst the various authorities, advisers, and legislators but this was of some use as it at least indicated what was *not* going to be done.

IV

The 'special' or 'secondary' reserve plan was as follows: the existing statutory cash reserve requirements for member banks would remain in existence and not be extended, under this scheme, to all commercial banks. But all commercial banks,[1] it was proposed, should be made to hold, in addition to legally required reserves, a special reserve of up to 25 per cent. against demand, and 10 per cent. against time, deposits. This special reserve could be held in the form of short-term government securities (with original maturities of 2 years or less) or in the form of other cash assets, i.e. balances with Reserve Banks, balances with correspondent banks, vault cash, and cash items in collection. These other cash assets could only be used to the extent that they already exceeded normal working needs, which were defined as 20 per cent. against demand and 6 per cent. against time deposits.[2] The power to impose and regulate these requirements was to be vested in the Open Market Committee and run for 3 years; the Committee would introduce the special reserve gradually, after an initial 10 per cent. and 4 per cent. requirement, as and when the credit situation demanded. The proposal listed the following as determining the timing or introduction of special reserves:

1. The volume and ownership of special reserve assets and of other assets readily convertible into them.
2. Gold movements, currency flows, and other factors causing a change in the supply of bank reserves.
3. Conditions in the government securities market.
4. The general credit situation.

The Board had calculated the ability of commercial banks to comply with the proposed requirements: with an initial special requirement of 10 per cent. and 4 per cent., all banks would have ample special reserve assets, but with the full requirement of 25 per cent. and 10 per cent. there would be substantial deficiencies, particularly amongst larger banks. These

[1] This proposed extension of Federal powers would have brought State non-member banks under a degree of Federal direction. Such an extension would be bitterly opposed.

[2] Country member banks, for example, held legal reserves of 14 per cent. and 6 per cent., but maintained other cash items, especially correspondent balances, to a greater degree than other banks. These latter could not be used as special reserves unless the total exceeded 20 per cent. and 6 per cent.

deficiencies would have to be met by the sale of bonds to, and the purchase of short-term securities from, the Reserve System unless, by the time the full requirement was ordered, the supply of special reserve assets had been sufficiently increased by Treasury 'unfunding'. The legal powers demanded by the System were thus sufficient to sterilize the short-term securities held by the banks and would force them either to sell bonds in order to obtain fresh reserves with which to expand their lending to private borrowers, or else to refuse such lending. Moreover, the multiple expansion possible upon a given increase in primary reserves would be drastically reduced. As for the level of interest rates, the special reserve would isolate the market in short-term government securities from the market in other forms of debt and enable short-term rates to be stabilized without difficulty (since the banks would no longer be able to sell out either to buy longer-term securities or to expand loans). What would happen to the long-term market was not clear; it was not intended, apparently, to withdraw support from that market, on the contrary, the maintenance of the bond market more or less intact was one of the reasons for putting forward the secondary reserve proposal. But once deprived of the opportunity to obtain reserves by selling short-term securities, would the banks not do so by selling U.S. bonds to the System? And what if other investors liquidated bonds on a heavy scale? Such bond liquidation was the more likely as and when any credit stringency was felt in the private debt markets and interest rates there began to rise (and they could undoubtedly rise considerably without appreciably affecting the demand for funds).

Given the quantity of government bonds outstanding it was highly likely not only that some such movement as is suggested above would take place—it was already beginning anyway—but that the scale on which it could take place was sufficient to offset the restrictive effects of the special reserve, both because of the direct expansion of credit involved thereby and because of the necessary creation of bank reserves which it entailed. Whatever the general effects might be, it does not seem that this special reserve would have restored the use of customary instruments, namely, discount rates and open market operations, unless and until the ability of the American public and the banks to turn U.S. bonds into money had been exhausted. Then, indeed, the supply of reserves would be dependent solely upon the willingness of Reserve Banks to lend to member banks or to buy government securities in the market, *or* upon the willingness of the Treasury to increase secondary reserve assets by converting bond maturities into short-term securities. The possibilities of this last factor were serious, given the likelihood of divided opinions among the authorities, and, far more important, the great difficulty that the Treasury

would encounter in selling medium- or long-term marketable bonds to anyone at all at yields very appreciably below those obtainable elsewhere.

The probable course of events can be outlined as follows, assuming throughout, a strong demand for credit from the private sector.

1. The banks are saddled with a secondary reserve requirement absorbing a *large* segment of their liquid assets. They thus find that they cannot obtain new reserves at will because they have no (or very few) free liquid assets to sell.

2. Let us assume that the banks do not sell out their bonds in order to obtain reserves and expand credit. They can do so, without losses, if par support continues but—for some reason—they do not. Borrowers will at once feel a stringency, mitigated only by willingness of the Reserve Banks to buy in the market on their own initiative, or by willingness of member banks to borrow from the System (possibly at a high discount rate). 'Private' money rates will rise at once (i.e. call loans, acceptance rates), followed, in all probability, by a bidding up of commercial and other bank loan rates.

3. Confronted with higher loan rates and credit rationing by commercial banks, many borrowers will seek to obtain money elsewhere, especially large borrowers with access to the securities markets. The volume of new issues will rise, raising interest rates on such issues relatively to the supported U.S. bond rates. Along with new issues, the demand for direct loans from insurance companies and other savings institutions will also increase. Such institutions hold large quantities of U.S. bonds yielding 2½ per cent. or less, which they now begin to sell (*without loss*) once the margin of yield obtainable by switching outweighs considerations of credit risk. If the holdings of government bonds of such institutions are down to some desired minimum percentage of total assets, a minimum decided by their liquidity rules, or capital losses on such bonds are inflicted by the withdrawal of par support, such switching will be deterred. Neither condition was present in 1947–8. The Reserve System would have bought the bonds and would thus have given to other institutions what has been denied to the banks—new credit and new reserves being created thereby.

4. With the new primary reserves thus obtained, the banks will invest (and absorb) a portion by investment in secondary reserve assets. Presumably, Reserve Banks will exchange primary for secondary reserves as required. But the aggregate reserve ratio will still be in excess of requirements and enable credit to be expanded further.

5. If commercial banks are willing to draw down their bond portfolios, the above process is shortcircuited, but any noticeable stringency of credit resulting from banking caution in face of new requirements brings that process into operation. In short, unless the secondary reserve is made

extremely high (and includes all U.S. government securities) and unless non-bank investors can be prevented from selling to Reserve Banks, it is difficult to see on what basis any real credit restriction is possible unless 'par' support is abandoned and sellers of government securities are involved in losses and afflicted with uncertainties which impart temporary unwillingness to lend long. But abandonment of par support was a move sufficiently drastic in itself to obviate the need for special reserve requirements.

6. While the Treasury will have no difficulty in selling 'shorts' which are eligible as secondary reserves, the sale of other marketable securities may be very difficult. A long-term marketable bond will hardly sell to anyone except the System, while further sales, or even the maintenance of existing holdings, of non-marketables may be difficult. With higher earnings in risk assets, the banks and others may also refuse a 5- to 10-year bond and thereby force the issue of secondary reserves in place of maturing bonds. Though mitigated, in 1947, by the fiscal surplus, such considerations will deter the Treasury from supporting the secondary reserve proposals.

All these difficulties were indeed foreseen if not at the time then certainly later; the conclusion is that the attractive isolation of the Public Debt from the private debt of the country could not be achieved by 'secondary reserves' so long as any significant proportion of the marketable debt remained unsterilized. It has thus become fashionable to advocate that Debt Reform should be undertaken, which would render all, save the floating debt, non-marketable—and even the floating debt might only remain marketable in a very restricted sense, the market being the banking system. Even this is somewhat of an illusion unless securities are not only non-marketable but cannot be encashed before maturity—only by, in fact, forbidding holders of government bonds from doing anything with them can the effects of appreciably higher interest rates elsewhere be offset.[1]

The logic of the secondary reserve proposals is thus somewhat severe, and the effects of not going the whole logical road would appear confusing—involving disruption in the credit machine to no particular purpose. If straightforward credit *restriction* were desired, one could legitimately say that the traditional use of existing powers would achieve the same ends (but with additional cost to the Treasury) without the necessity of

[1] By 1950 Mr. Eccles publicly recognized these difficulties: in his article, 'The Defense of the Dollar', *Fortune Magazine*, Nov. 1950, he advocated increases in primary reserve requirements to offset autonomous reserve flows, plus a secondary reserve to restrain bank lending. He went farther than this: 'If the large institutional holders of government securities should undertake to sell their holdings for the purpose of making loans and other investments, it might be necessary to get authority to prevent such sales to the extent that the Federal Reserve, in order to support the market, may be required to purchase the securities.'

complex legislation and difficult administration which would, beyond question, entail a centralization of monetary power in the Federal authorities to which the banking community would be hostile. Moreover, the special reserve would penalize the banks while leaving other credit institutions free. If, on the other hand, one did not want to restrict credit, but simply to discourage an expansionary urge inherent in the market situation, without abandoning at least the 'long' end of the rate curve, then special reserves were clearly unwelcome and utterly distinct from, and incompatible with, a 'market restraint' policy based on manœuvres within the existing market. To this latter way of thinking, changes in reserve requirements were of some psychological use but were primarily a means of offsetting some extraordinary supply of bank reserves (e.g. gold inflows) which could not be mopped up in any other way. For these purposes, an increase in primary reserves was required, not a sterilization of short-term securities possessed by the banks.

Confronted with these serious objections, it is difficult to see why the Board put forward the proposal, or why it placed such high hopes upon its efficacy. For it would seem to create more problems than it solved. One can make two suggestions. Firstly, there is reason to believe that, when the scheme was formulated, heavy institutional selling of U.S. bonds was not anticipated; it was thought that bonds were firmly held. This was a basic error. Secondly, the proposals may have been something of a *ballon d'essai* through which to foster proper understanding of the situation in which the System found itself. If people objected to inflation, then they must not expect the System to stop it unless either they were prepared, in effect, to support legislation controlling the credit system from top to bottom, or unless they were prepared to permit an unsupported market in government securities. But it cannot be denied that the Board's advocacy of these proposals must reflect belief that outright general credit restriction was desirable at that time, in spite of equally firm beliefs that increased production and fiscal disinflation were the proper answers to inflation, and that interest rates on the Public Debt could not, for a number of familiar reasons, be allowed to rise significantly. The episode is an unfortunate one. It is difficult to understand the reasoning behind the statement that: 'The plan, in effect, would divorce the market for private debt from the market for government securities.'[1] Clearly the 'Secondary Reserve', as proposed, would do no such thing. The suggestion goes oddly with an enumeration of the following other items of an anti-inflationary programme: increased productivity, wage restraint, price restraint, greater fiscal disinflation, regulation of instalment credit, less liberal housing

[1] Statement by Chairman Eccles, on behalf of the Board, to Joint Committee on Economic Report, Nov. 1947 (*F.R. Bulletins*, 1947, pp. 1455–63).

credit, and renewed Savings Bond campaigns. It goes equally oddly with a strong statement of the case for bond support. 'Higher interest rates do not deter the lender, at some point they do deter the borrower. I doubt if anybody knows how high interest rates, especially short-term rates, would have to rise to discourage borrowers. . . . Bank customers . . . are hardly to be deterred by one or two points of increase in interest rates. . . . the Treasury would be confronted with a continuing puzzle . . . entirely at the mercy of uncontrolled factors in the market, if, indeed, conditions did not become so chaotic as to demoralise completely any refunding operations.' (Wholesale encashment of Savings Bonds was also feared.) Mr. Eccles did refer to the menace of non-bank bond liquidation, but did not suggest how the special reserve would overcome it or admit that it would increase it; his argument seemed to rest entirely on the restraint of commercial bank lending, which might follow from secondary reserve legislation, without reference to the offsetting repercussions of bond support. It should be noted, of course, that high reserve requirements do nothing to affect the liquidity of a bank from the solvency viewpoint—if bankers wished to increase the proportion of loans to total assets, the secondary reserve would not deter them.

V

These proposals received short shrift from Mr. Snyder, whose public disagreement with Mr. Eccles caused some annoyance. Why call a special session of Congress when the authorities could not themselves agree on what was to be done? The Treasury, after acquiescing at last in a rise in short-term rates from war-time levels during the summer, exhibited feelings of some satisfaction with its monetary and debt management policy. Announcing, for example, in its report for 1946–7, that debt repayment had been, on balance, more than concentrated[1] on bank-held securities, i.e. that some new funding had also taken place, it held that this 'contributed substantially to reduction in inflationary pressure' and was made possible by 'the large sums made available for Trust Fund investment during the year, the remarkably good record on redemption of Savings Bonds, the continued successful sale of new (Savings) Bonds, and the restrictive debt management and monetary policies of the Treasury and Federal Reserve System'. Thus, when giving evidence on

[1] The repayment of debt to the banking system had been larger than the reduction in the debt total. The reduction in debt total in 1946–7 was made mostly out of funds obtained in the Victory Loan of Oct.–Dec. 1945, the fiscal (budgetary) surplus did not appear until 1947–8. The Victory Loan purported to be an immediate post-war funding operation: if 'funding' means reduction of floating debt, it was so; if it means placing debt outside banks, then it was to a large degree not so, owing to large-scale (but unwanted) indirect bank subscription to the last two loan drives of 1945. Genuine savings drawn into those loans were largely spent in the tail end of the war-time fiscal deficit. See also p. 2.

17 November 1947 before the Joint Committee on the Economic Report, Mr. Snyder urged a larger fiscal surplus, a savings drive, stricter supervision of bank loans (along with a voluntary restraint campaign),[1] and the reimposition of instalment credit control. On these points Mr. Snyder and Mr. Eccles were in agreement. But the former insisted that greater fiscal severity was preferable either to Mr. Eccles's secondary reserve plan or to any scheme involving higher interest rates. He was 'against it, because I do not think it will achieve the ends he expects', and, with a quick and anxious glance at his own garden, he thought that 'you have got to guard carefully against taking any action that will have a worse effect in another field—debt management'. Fundamentally, it seems, Mr. Snyder opposed any form of *general* credit restriction, and was at this time feeling satisfied that the steps taken to stop, for instance, 'pattern-playing',[2] were almost all that was required of a market policy. For the rest, he relied on the placing of public debt outside the banks, and said he was studying means of sterilizing newly imported gold. Mr. Snyder was not alone in his opinion of the special reserve. The National City Bank of New York commented in its monthly letter for December 1947: '... the authorities have shown considerable versatility in approach. They have injected uncertainties into the money markets, uncertainties which reinforce the banker's caution. They have displayed greater courage and determination in dealing with the situation than many observers had expected. Not least of their accomplishments has been the breaking of the dangerous boom in long-term bond prices.' This commentator was both hostile to the secondary reserve proposals and sceptical of their possible effects. Such views were also made clear in a statement issued by the Federal Advisory Council[3] (on which Randolph Burgess, a leading figure in National City, was an active member). The Council condemned the proposal on three counts: firstly, impracticability, due to varying needs and balance sheets of different banks; secondly, on anti-socialist or anti-centralist grounds—'would substitute the edicts of a Board in Washington for the judgements of the Boards of directors of 15,000 banks throughout the country as to the employment of a substantial part of

[1] On 24 Nov. 1947 the bank supervisory authorities of the U.S.A. (Board of Governors of F.R. System, Comptroller of the Currency, Federal Deposit Insurance Corp., and Nat. Assoc. of Supervisors of State Banks) issued a joint statement. It began with the words 'our country is experiencing a boom of dangerous proportions', and continued, later, 'are unanimously of the view that present conditions require the bankers of the country to exercise caution in their lending policies'.

[2] i.e. selling short-terms to F.R. at pegged rates and buying longer, the movement causing high bond prices and considerable speculative gains. It may be asked, whenever this process is referred to, why counterselling of bonds by the Central Bank did not occur. In 1945–7, the Reserve System had been reduced to the position of having no bonds of its own to sell and use of Treasury trust fund holdings was then not practicable.

[3] Reprinted, *Annual Report F.R.B.* 1947.

the funds of their banks'; thirdly, because existing powers were adequate. The President of the Advisory Council, Chairman Brown of the First National Bank of Chicago, expounded this position before the Joint Committee and, to dispel certain misunderstandings, denied that the Council disagreed with the bond-support policy.

Final criticism came from President Sproul, exponent of the 'market-restraint' view, testifying early in December. He doubted whether the expansion of bank credit had so far been a major causal or aggravatory factor in the current inflation, but condemned the secondary reserve proposals mainly on the grounds that their imposition would cause grave market disturbance without in any way resolving, but rather indeed aggravating, the dilemma posed by bond support. He followed up this statement with a speech to the New York State Bankers' Association six weeks later: 'I say we can't bring about deflation by general credit action unless we bring about such an indiscriminate reduction in consumers' disposable incomes as to threaten the kind of disaster we are trying to avoid.' Their objective was 'to prevent bank credit adding further to inflationary pressures and, if possible, to reduce somewhat the supply of money', and the present course being followed was the best one available. Reinforcing his previous views on the secondary reserve or, equally, on the raising of primary reserve requirements, and their effects on the bond market, he pointed to the events of the preceding weeks.[1] 'It should now be obvious,' he said, 'if it was not five weeks ago, that the market would not absorb such unloading and the Federal Reserve Banks would have to take even more vigorous support measures' (in the event of higher primary or new secondary reserve requirements). 'It is quite possible, in these circumstances, that more credit would be put out than could be locked up by the new requirements. The result would be a further random distribution of Federal Reserve credit at a time when new measures were being taken to tighten reserves.'

VI

Meanwhile, the Board had temporarily shelved its proposal and come to some general agreement with the Treasury. This agreement included those points of no-dispute already noted, reaffirmed support of the 2½ per cent. long-term rate, and declared that debt-retirement policies would be effective for the next few months of fiscal surplus. On the question of reserve requirements, the special reserve was shelved but it was conceded that 'possibly stronger measures may be necessary when current debt-payment operations slack off'.

[1] Heavy bond support due to weaknesses referred to on p. 3. There had also been a panicky wave of selling subsequent to a lowering of support prices closer to par on 24 Dec. 1947.

After this controversy both within and without the System, and conceivably connected with it, Mr. Eccles was informed that his Chairmanship of the Board would not be renewed on the expiration of his term on 1 February 1948. His term as a Governor did not expire until 1958 and he was asked to accept the Vice-Chairmanship of the Board. Mr. Truman signified this intention in late January 1948 and at the same time appointed Mr. Thomas B. McCabe to fill the unexpired term of Governor Ransom (deceased). Mr. McCabe was a manufacturer of paper and had been chairman of the Board of Directors of the Reserve Bank of Philadelphia. After sending his name to the Senate for ratification as a member of the Board, Mr. Truman also signified that Mr. McCabe would be designated to fill the vacant Chairmanship. The appointment was ratified on 12 April and Mr. McCabe assumed the Chairmanship on 15 April. On 26 May Mr. Eccles wrote a tart letter to the White House withdrawing from his prospective Vice-Chairmanship in view of Mr. Truman's delay in designation. He remained on the Board.

Thus the secondary reserve proposals ended, whether by coincidence or not, in the fall of Chairman Eccles after nearly 14 years of leadership. Originally appointed by Mr. Roosevelt to reorganize the System, he had come to Washington from Utah where he was, and is, the owner of considerable banking and construction interests. He had come to Washington as a liberal converted to that faith by the catastrophe of the Great Depression. Much of the great banking legislation of the 1930's is the work of Mr. Eccles, and his must be accounted the dominating influence in the System during most of his long reign as Chairman. In the post-war period, however, it must be said that he seems to have become increasingly an isolated figure. The tenor of his utterances is that of a man fighting against public opposition for what he believes to be right, rather than that of the head of a Central Bank pushing his views in co-operation with other administrative chiefs. He wanted to stop inflation and was dissatisfied with the measures adopted or acutely conscious of the lack of them. His anxiety led him to advocate a drastic, but ill-formulated, increase in Central Banking powers whose chances of overcoming political opposition he must have known to be slender. This advocacy revealed, publicly, his isolation and showed him to be in conflict with his operating chief, Mr. Sproul. Although he spoke on behalf of the Board, his influence on that body was known to be such that he had to bear personal responsibility for it. Confronted with public disagreement between the monetary managers of the U.S.A., Mr. Truman evidently decided that Mr. Eccles would have to go, if he had not already made such a decision.[1] But he

[1] Alleged political pressures, associated with litigation between the Reserve Board and Transamerica Corporation, have been mentioned with regard to Mr. Eccles's dismissal.

did not and could not remove this forceful personality from the System. Mr. Eccles elected not to resign from the Board but to continue as a Governor. The System did not lose his vigorous mind and beneath the controversies of subsequent years his influence is easily discernible. His dismissal may be regarded as strengthening the position of Mr. Snyder, but it does not appear that the Treasury in fact gained as much as might have been expected.

VII

The debate was over. In his budget message delivered in January 1948 Mr. Truman declared that 'our debt management policy is designed to hold interest rates at the present low level'. Low interest rates and stable bond prices had facilitated reconversion finance, had been a major factor in business confidence, and had relieved the tax burden. 'The Treasury and Federal Reserve System', said Mr. Truman, 'will continue their effective control of interest rates.' Similar views are found in Mr. Snyder's Report for 1947–8, though this document did not appear until a year or so after Mr. Truman's above message: 'Stability in the government bond market during the post-war period has made a significant contribution to . . . prosperity. This . . . will continue to be of utmost importance in maintaining prosperity. . . . Confidence in the credit of the U.S. Government—which is reflected in the condition of the market for our government securities—has become the keystone upon which rests the economic structure of the world.' This rather Daltonian phraseology finds no echo in the reports of the Board—not surprisingly considering that 'credit of the U.S. Government' largely consisted of 'credit of the Reserve System' whose lavish provision created unpleasant problems whose solution was not primarily the responsibility of the Treasury. This is not, however, to deny to Mr. Snyder and his associates the credit for successful debt-repayment programmes and other measures, besides their strong advocacy of other necessary anti-inflationary controls and policies. Perhaps the most able pronouncement of Treasury policy was that delivered by Under-Secretary Wiggins to the American Political Science Association on 1 April 1948.[1] After pointing out the success of Treasury operations with Trust funds and Investment bonds[2] the previous summer and autumn, Mr. Wiggins made the following points on the Interest Rate question:

1. Correct or not correct, 2½ per cent. was the rate used in war finance and a depreciation in the dollar value of the vast investment holdings

[1] See 'exhibits' Treasury report 1947–8.

[2] Sales of bonds by Federal Trust Funds, and the issue of a non-marketable Investment bond to savings institutions had, in conjunction with rising short-rates, helped to avert a feared resumption of an earlier boom in bond prices associated with an inappropriate relationship of short rates to long rates.

of U.S. banks, businesses, and individuals would involve serious book losses, a threat to financial stability, and undesirable repercussions in the marketing of public and private debt.

2. Higher rates would increase the burden on the Federal Budget.
3. With the contemporary dominance of government security rates, a rise in those rates would upset the long-term plans of private business.
4. Nobody could predict the future financing needs of government. To destroy the 2½ per cent. basis now would multiply difficulties of future financing and make refunding much more difficult.
5. The term 'natural level' of interest rates added little to the discussion. The ruling rates merely reflected official policy. Who could say what a 'natural level' was? In the long run, however, he admitted the term might make sense. Too low a level led to over-investment in the long run and vice versa. It was therefore necessary for monetary authorities to recognize these long-run consequences.
6. But it should be admitted that maintenance of 2½ per cent. left no room for flexibility in credit control, as the short-run considerations must necessarily be dominant. This meant that long-run consequences must be offset by fiscal policy. Careful and appropriate budgeting was the solution. It was, for instance, 'crazy' to run a deficit at that time.
7. Some adjustments could be and had been made in short-term rates, but even this required great care and caution, presumably because the market might run away and force even higher short rates.

This statement went most of the way with the views of, for example, Mr. Sproul at that time, but inevitably left room for dispute concerning the level of short-term rates and the timing of changes in them.

VIII

One attempt, therefore, to extricate the System from its position had failed. A 'banking regulation policy' was 'out' for the time being. 'Market restraint', in conjunction with fiscal pressure and other expedients, was left a clear field in which to develop. The policies associated with the recession period, and those which have been current since then, have been market policies of restraint or ease. With the development of the present emergency, however, and failing a sufficiently austere budget, 'banking regulation', still advocated, but now with much greater realism by Governor Eccles, may enjoy something of a revival. But at the time of writing (April 1951) it looks as though the three views which the

Secondary Reserve controversy brought into the open, are to some extent being synthesized.

In spite of, or as a result of, an extremely forthright and at times acrimonious controversy which raged from August 1950 to March 1951, the following tasks have been accomplished by the monetary authorities as a contribution to an anti-inflationary programme. It will be seen that exponents of 'market restraint' have achieved the greatest victory to date, while other protagonists have achieved substantial, if supplementary, gains. The former first obtained, in September 1950, a rise in short-term rates in open defiance of the Treasury—the Reserve System footing an underwriter's loss on a Treasury issue in order to permit a market rate which would be higher than the rate that was offered by the Treasury. In December 1950 the Treasury issued a 5-year security, a banker's bond, in reluctant response to Federal Reserve insistence on a reduction of the floating debt at a time when the Treasury could more easily have sold a 12-month security. Finally, in March 1951 there fell the greatest stronghold of all, par support of the key 2½ per cent. bonds was removed, their prices having fallen since to nearly 96. While the market restraint school would not have dared, in 1947–8, to abandon par, the weaknesses of the market being so great as to threaten extreme disorder, the situation in 1951 permitted such abandonment—reasons for which cannot be detailed here. Infliction of capital losses and uncertainties on lending institutions in a market still highly sensitive, if no longer panicky, has thus become an integral part of a banking policy designed to restrain the monetization of the National Debt without sacrificing the financial strength which an orderly and reasonably stable market in that debt gives to the entire credit system. Exponents of direct regulation, the 'Eccles School' of 1947–8, have found some outlet in the raising of primary reserve requirements in January 1951, and in the partial conversion of the 2½ per cent. 1967–72 bonds into a 2¾ per cent. 25-year non-marketable bond. These new bonds cannot be cashed before maturity save indirectly by exchange into (at present) 1½ per cent. 5-year marketable notes which may or (as at present) may not be saleable without loss. This original experiment in Debt Reform has been accompanied by a vigorous campaign conducted by the Treasury, the third of the 1947–8 protagonists and the one whose position has been most severely weakened by the 'market restraint' victory, to sell non-marketable savings bonds[1] to individuals and institutions. Finally, the Treasury has extended the life[2] of existing savings bonds,

[1] Analogous to our own non-marketable public issues of Savings Certificates and Defence Bonds.

[2] This expedient had not been tried before in the U.S. and the Treasury was apprehensive of public reaction. It was thought holders might insist, owing to mistrust, on being paid back on time.

several tens of billions of which mature within the next few years. Meanwhile, in spite of much publicized disharmony, all the monetary authorities have clamoured for a balanced budget, have supported selective credit controls, and backed the campaign for the voluntary restraint of credit that is being conducted by the commercial bankers.

NUFFIELD COLLEGE,
OXFORD.

SOME ASPECTS OF COMPETITION IN RETAIL TRADE

By MARGARET HALL

In an article entitled 'Some Aspects of Competition in Retail Trade', *Oxford Economic Papers*, June 1950, Mr. Andrews includes me in a group of economists who regard the 'modern theory of monopolistic competition as applicable . . . to retail trade'. Though it is by no means clear what Mr. Andrews's arguments are, his position seems broadly to be as follows: He dislikes the application of this analysis to retail trade because it 'contributes to the widespread suspicion of the extent to which it [retail trade] serves the social interest' (p. 137). Working on the assumption that perfectly competitive markets automatically guarantee the social interest, he then tries to show that the existing degree of uniformity of prices for the same 'type of good' at retail is unambiguous evidence of a high degree of competition.

I do not wish, in this note, to challenge Mr. Andrews's assumptions and propositions one by one but simply to demolish the three main pillars on which his theoretical structure rests. These are: first, his redefinition of competition; secondly, his use of the concept 'the same type of good'; thirdly, his failure to distinguish between uniformity of price for a given article or type of article at a given time and over a period of time.

Mr. Andrews holds that if he can show that retail trade is competitive, it will automatically follow that its operations are in the social interest. He proceeds to give the following definition of competition: 'What, then, is the essence of competition? . . . It is simply that no seller can get a price which is higher than would be taken by any potential seller of his type of product' (p. 141). What does this mean? Assuming, for the moment, that we know what is meant by 'his type of product', does not this definition of competition mean that the seller gets as much as he can for his product? This is surely the familiar assumption of the economic man who tries to better himself to the greatest extent. We may or may not like this assumption, but I am aware of no alternative assumption at present with which to replace it and Mr. Andrews does not provide one. This assumption is made of all sellers, irrespective of the type of market; it cannot, then, be used to distinguish the degree of competition in the market. What the 'modern theories of business behaviour', of which Mr. Andrews disapproves, are trying to do is to identify the kind of price and sales policies which entrepreneurs consider serve them best. These policies differ according to the number of sellers, the degree of differentiation of

product, the location of sellers and buyers, and, above all, the assumptions made by particular sellers about their competitors' reaction to any changes in price or product that they themselves make. This last brings clearly to light the necessity of distinguishing short- and long-run considerations and static and dynamic factors. All these considerations can be categorized as affecting the degree of certainty with which the entrepreneur can be assumed to know the prices his products will realize. This is, as modern business theorists would be the first to admit, a field in which we have gone little distance. If Mr. Andrews were advancing our progress, this would be a matter for congratulation. If he were re-emphasizing the shortness of the distance already covered, this would be useful. But to deny the existence of these problems seems to be a backward step. Mr. Andrews is assuming that there is in retail trade an identifiable competitive level of price for 'goods of the same type' and that actual prices will tend towards this level.

The second source of confusion is the idea of the potential seller of the retailer's type of product. If Mr. Andrews wished to refer to a given product, he would presumably use the word 'product' and not 'type of product'. It would seem that he has in mind that the progressive standardization and branding of the products sold at retail gives rise to a number of brands, say, of cigarettes which can all satisfy the smoker to a certain but not to the same extent. Mr. Andrews has to account for the existing degree of price differentiation between competing brands; for the high degree of inflexibility of prices over a period of time; and for the high degree of uniformity of prices as between different sellers. To the first he pays no attention. The third, which is the heart of the matter, he does not explain. A discussion of it would have exposed the ineptitude of Mr. Andrews's concept of the commodity the retailer is selling. We will deal with this point more fully at a later stage.

Mr. Andrews talks at length about the inflexibility of retail prices. He regards them as evidence of the perfectly competitive character of the market. He argues that wherever we find a standardized article sold in fully competitive conditions, there we shall find inflexible prices which do not fluctuate hourly in response to short-term changes in demand or supply conditions, but which do fluctuate in response to long-run changes in both demand and supply conditions. If this last were conceded, then Mr. Andrews would be entitled to argue, as he does, that the short-run inflexibility of prices at retail was no more than a convenience to both buyers and sellers. His association between fluctuating prices and non-homogeneous commodities would then be in order. What he says is that we should not like to go back to the bazaar, 'to the chaffering between dealers and their customers which takes place in primitive and undeveloped

markets'; in fact, we should not like to bargain about a tin of cocoa as we would about a horse. This is certainly true. But the further deduction is misleading: 'Competition . . . tends to make for uniformity of prices and "higgling" should rather be taken as a sign of the uncompetitive market.' There seems to be some error of logic here; though we would all agree that the text-book definition of perfect competition presumes perfect knowledge and therefore excludes higgling in principle since both buyers and sellers are, and know they are, incapable of affecting price, we cannot therefore deduce that markets in which there is no higgling are therefore competitive. A copy of every book published in Britain is in the Bodleian Library. It does not follow that all the books in the Bodleian are published in Britain. There are other requirements of the competitive market than the absence of higgling. The phenomenon of listed prices should be related not to the degree of competition in the market but to the standard of literacy of the population and the most appropriate method by which the trader can transmit information about availabilities—one of his principal functions.

The identification of listed prices and of price inflexibility over a period of time with prices which are uniform as between different sellers is, perhaps, the most misleading of the positions which I want to dispute. Mr. Andrews takes his statement of the compatibility of listed prices, inflexible in the short period, with competition to support the entirely different thesis that uniform prices as between different retailers at any given time is compatible with fully competitive conditions. This confusion depends on the lack of definition of the concept of the retailer's 'type of commodity'.

One of the reasons for abandoning the tools of the analysis of perfect competition in discussions of retail trade arose from the inadequacy of the classical conception of a commodity in this context. While the concept of a commodity can suitably be applied to any article the retailer sells, such as a three-and-sixpenny packet of 'Player's' cigarettes, it is misleading to talk of these cigarettes as the retailer's type of product, because it is impossible for the shopper to buy such a packet of cigarettes without simultaneously buying the retailer's services in selling that package. Even if the 'potential seller of the retailer's type of product' be taken to refer to the category of boxes of twenty cigarettes, 'du Maurier' at three shillings and sixpence; 'Gold Flake' at three shillings and sixpence; 'Churchman' at three shillings and eightpence; we are not any nearer to meeting the point at issue which is that the services of no two retailers are similar and that the sale of the article and the retailer's services is a tied sale. The price paid by the customer is a price for services plus article. We said above that to define the perfectly competitive market as one in which 'no seller can get a price which is higher than would be taken by

any other potential seller of his type of product' was, even if type of product was taken to mean the product, a useless endeavour since this condition applied to all sellers irrespective of the degree of competition in their market. We now find, upon examining the concept of the type of product the retailer sells, that the condition is anyhow without meaning. There is, strictly speaking, no potential seller of any retailer's type of product in so far as no two retailers will present the shopper with the same aggregate of retail services, including geographical proximity.

Mr. Andrews might reply that this is splitting hairs; that, of course, we do not expect the services of two retail sellers to be identical but only to all intents and purposes similar. Even so, the concept must be rejected on two counts: first, Mr. Andrews's thesis requires there to be a large number of similar sellers and this is most unlikely; secondly, in fact, geographical separation and diversity of service are of the essence of retailing and to assume them away is not to simplify the problem but to avoid it.

An examination of Mr. Andrews's account of price fixing at the retail level shows that he has not himself made up his mind how retailers do, in fact, behave. Sometimes we are led to believe that retailers fix the price of particular articles with reference to the cost of selling them, a practice which we would expect of them if we are to accept Mr. Andrews's description of their behaviour in terms of the perfectly competitive model; but, at other times, we are told that retail prices are 'a matter of historical conjecture'.

> 'When we are studying any particular shop, we shall find that the trader has a definite price policy for any particular type of article, setting a given proportionate gross profit margin upon it. Frequently, the majority of articles in which he trades will bear the same margin, i.e. the prices will be in the same relation to the cost of them to him. It is true that the fixing of retail prices must be a matter of historical conjecture but one can see that the proportionate margin is an easy way of translating a price policy into practice. The retailer normally has to think in terms of a large number of articles and must have some rule of thumb for deciding his policy on a new article within his class of trade. The proportionate margin does rough justice and makes some sense, in so far as the more expensive articles of a given type cost more to sell or involve more service or are sold relatively less frequently. Why the margin should have come to be determined at such and such a figure it is, however, impossible to say. The point that we have to remember is that, given margins, the development of competition in retailing will enforce a rational basis to them in terms of the service which the retailer has to provide.'

It is precisely this adaptation of type and degree of service to inflexible prices rather than in response to consumer preferences expressed in competitive bidding, that is rather than in response to consumer demands, that others regard as the symptom of market imperfection. Since the retailers' service and the article sold are a 'tied' sale, there is no way in which the consumer can manifest his preference for more or less service

relatively to lower or higher prices where, by conventional pricing, prices are maintained uniform as between different sellers. There is really no reason to suppose, with Mr. Andrews, that more expensive articles cost more to sell. The cost of marketing a pound's worth of merchandise depends not on the price per unit of the merchandise (this is presumably what he means by expense) but on the salesman's particular techniques and, above all, on the rapidity of his turnover.

But Mr. Andrews is not, after all, quite sure of his facts. Perhaps gross margins are, after all, related to marginal (operational) selling costs. We read (p. 149): 'The retailer . . . will not necessarily place the same margin on all that he sells . . . it is usual even for the specialist retailers to deal in a great variety of goods. Some of them will be more expensive or more troublesome to sell than others and the retailer will tend to take a higher margin on these, for the market will be such that competition in these is normally only at a price higher relatively to cost.' However, such *arrières pensées* are tacitly abandoned, since, if there are in fact substantially uniform prices at retail for similar articles and also uniform prices at the manufacturing level (Mr. Andrews says we need not bother about the wholesale trade), we should not expect prices at retail to be uniform in the face of differing distribution costs were the market fully competitive. Mr. Andrews wishes to show that uniform prices at retail are evidence of competition, so he drops the above considerations.

Having rejected the thesis that retail prices are the long-term outcome of the competitive action of the forces of supply in the form of cost of production and of consumer demand, we find that nothing remains of the argument that the economic forces at work in retail trade are of such a kind as automatically to secure the social interest.

There remains one subordinate thesis; it relates to the technology of retailing. The absence of price competition at retail impedes the evolution of new techniques in so far as the innovation is directed at securing lower costs of distribution. This is because the new enterprise, where there is resale price maintenance and also where there is the convention on the part of sellers to maintain uniform prices, is prevented from attracting custom by price reductions. Moreover, where maintained prices are widespread, the customer ceases to be price-minded so that the gains to be expected from price reductions, in the form of increased custom, cease to be decisive. Mr. Andrews will have none of this. He refers to the existence of different types of retail shop, including the cash-and-carry multiple store, in defence of his denial. In fact, one swallow makes a summer. The fact that any technical innovation at all has occurred in the face of conventional uniformity of prices is taken to be sufficient evidence that it is no impediment to technical progress.

It is difficult to resist the conclusion, on re-reading Mr. Andrews's article, that his belief that all is well with distribution does not arise from a critical appraisal of the facts but, itself, does much to fashion the appraisal he gives.

SOMERVILLE COLLEGE,
OXFORD.

TWO COMMENTS ON 'COMPETITION IN RETAIL TRADE'

By C. W. EFROYMSON

1. Resale Price Maintenance

In his article 'Some Aspects of Competition in Retail Trade'[1] Mr. Andrews argues in favour of legislation which permits manufacturers[2] to fix minimum resale prices on brand-named products. This seems to me the more surprising in view of his confidence in competition and the general ability of consumers to choose rationally.

'A standard branded product whose price is subject to arbitrary variation between retailers will lose the good will', Mr. Andrews thinks, 'both of retailers and consumers' (p. 162), and the result of 'competition of the loss-leader kind' is to 'prevent branded goods from playing their important part in the process of competitive trading'.[3]

But manufacturers of branded articles occasionally arrange for, or co-operate in temporary—'introductory'—selling at reduced prices, either through all or only through some retail outlets. Moreover, in the United States (I do not know whether the same is true in England) the 'independent' retailers have been the principal protagonists of resale price maintenance, with manufacturers taking diverse attitudes. In fact, reluctant manufacturers have often fixed or raised minimum resale prices only after organized pressure—amounting in some cases to boycotts—of 'independent' retailers.[4]

These phenomena indicate that not all manufacturers of branded goods think that sale of their products at 'cut prices' will reduce their sales. They may in fact fear that by yielding to the constant pressure of marginal retailers for higher minima, consumer preferences will shift to non-price-fixed and to unbranded lines.[5]

[1] *Oxford Economic Papers*, New Series, vol. ii, No. 2 (June 1950).

[2] Following Mr. Andrews, I use the term 'manufacturer', although the owner of the brand name may be a middleman.

[3] p. 163. I do not understand Mr. Andrews's reasons, stated on p. 164, for dismissing the possibilities of manufacturers 'benefiting from increased trade'. The principal advantages claimed for brand-name selling are: (1) 'Economies of large scale production' (p. 164) and (2) 'the maintenance of quality standards for products whose quality . . . has to be learned by experience' (p. 161). To (1): brand-name promotion may so split up the formerly common market that no producers can exploit the advantages of scale. Conversely, it is easy to exaggerate advantages of scale. To (2): Mr. Andrews thinks that 'Those who establish a brand therefore learn by experience that they must maintain quality' (p. 170). But if consumers cannot quickly detect deterioration, short-run extra profits due to lowered costs achieved by debasement of product may exceed long-run losses due to consumer recognition, or the entrepreneur may think so.

[4] Cf. Ewald T. Grether, *Price Control Under Fair Trade Legislation*, New York, 1939, pp. 92 ff. and p. 268. Cf. also B. S. Yamey, 'Notes on Resale Price Maintenance', *Economica*, vol. xvii, No. 67 (August 1950), p. 256 and note 1.

[5] Ibid., pp. 272–3.

With respect to the lower prices of large-scale retailers 'whose actual costs of trading are low',[1] Mr. Andrews charges that their cost advantage is obtained 'at the expense of imposing some extra costs upon the consumer' (extra fares, inconvenience, and loss of certain personal services). But Mr. Andrews's basic proposition is that heterogeneous, non-price competition offers consumers the possibility of rational choice among different modes of retailing. Resale price maintenance prevents those retailers who can obtain lower costs at the expense of service from passing on the advantage in the form of lower prices, and deprives consumers of the choice of buying at lower prices with lesser service.

Suppose, however, that the 'leader' really is a 'loss-leader', that is, a sale at less than invoice cost plus average expense of doing business, or (estimated) expense of selling the particular branded article. Losses on such sales will have to be recouped by 'margins which are maintained relatively higher than they need be for other goods' (p. 164). If consumers are able to judge values, as Mr. Andrews implies, the retailer will lose sales of other goods to retailers who do not cut prices. His price-cutting will be unprofitable; the competitive forces on which Mr. Andrews wishes to rely will prove to the price-cutter the error of his way. Meanwhile some consumers will have enjoyed the advantage—at the expense of advertising media—of lower prices.

To summarize: Price maintenance interferes with competition by depriving the consumer of an important choice among retailers, and is probably—at least in the long run—unnecessary, because losses on 'leaders' must be recouped by higher margins on other goods—whereby trade will be diverted from the 'arbitrary' price-cutter. But the foregoing conclusions depend on the validity of Mr. Andrews's assumption that consumers can evaluate and compare. In so far as they cannot, his particular argument in favour of price maintenance is bolstered; but his general argument (in favour of free competition among differentiated retailers) is endangered.

2. Advertising which creates Wants

Mr. Andrews concludes his discussion of advertising with the judgement that 'In a stable situation, advertising costs . . . will justify themselves only in so far as they enable a sufficient reduction of costs elsewhere' (p. 171). But he admits two exceptions:

[1] It is difficult to distinguish in fact (if not in theory) between 'arbitrary' price variation, such as the 'loss leader', and lower prices which reflect the lesser costs of some retailers (cf. Grether, op. cit., p. 269). Mr. Andrews insists that if, 'as is the case', certain retailers 'have lower costs, that should be reflected in their *general* price policy . . .' (p. 164). But this also would mean prices on branded goods lower than prices which would cover costs of higher-cost retailers. Moreover, the particular costs of selling branded articles may well be less than average costs of selling. The owner of the name through his promotion has borne part of the selling cost; and this is reflected in invoice cost of the branded goods. Why, then, should the retailer's saving in selling branded goods be spread generally over all his sales?

1. Advertising which 'can so successfully play upon the hopes and fears' of consumers that it creates the wants which are to be satisfied. Mr. Andrews would 'dismiss this case' because 'it is relatively unimportant so far as normal industry is concerned' (p. 167).

'This case' is defined as 'goods whose attraction lie entirely in the minds of the consumer—such things as lucky charms . . .' (p. 167). But if we substitute for the word 'entirely' the phrase 'wholly or in part', 'this case' will expand to comprise the vast realm of 'fashion goods'. An enormous proportion of all retail advertising attempts to impute the quality 'fashion' or 'style' to goods of all sorts, and the quality or usefulness thus added to the goods lies, I believe, 'entirely in the mind of the consumer'. Moreover, the attraction of this quality and its 'fickleness'[1] are themselves largely the product of advertising. Manufacturers and retailers may complain of extra costs—or losses—due to sudden changes of fashions;[2] but they strenuously endeavour to *invest*[3] their products with the quality 'style', and also, by advertising 'new styles', to create obsolescence by depriving products in the hands of consumers of the quality 'style'. Style consciousness and fickleness are I think produced, or at least effectively stimulated, by advertising.

2. Mr. Andrews grants that 'in the short run' advertising's 'persuasive function' may be 'much more important' (p. 169). But how are we to distinguish between the short and long run? All advertising of fashion goods, and also of stocks offered at particular prices, has the immediate purpose of increasing tomorrow's sales; and usually also the long-run purpose of attaching consumers' preferences to the advertiser. Even brand-name advertising is usually combined with an immediate appeal—a particular style or stock of goods or price.

I conclude that Mr. Andrews's two exceptions cannot be confined in the narrow limits assigned by him, and that advertising which does not result in economies of scale, and which cannot justify itself by enabling 'a sufficient reduction of costs elsewhere', should not be dismissed as 'relatively unimportant so far as normal industry is concerned.'

[1] Mr. Andrews says, p. 170: 'All that can be said is that it is the essence of this sort of trade that it is fickle; and that the quality which causes this fickleness is greatly valued by the consumer.'

[2] 'Fashion' and its fickleness increase costs both of manufacture (changes of dies, &c., discontinuity in production) and of distribution (losses on goods which have 'gone out' of style, larger inventories, lowered 'turnover').

[3] Fashion advertising might be called 'investatory'. In the United Sates, producers of eyeglasses and of furniture, *inter alia*, have campaigned, effectively, to introduce fashions in their fields.

BUTLER UNIVERSITY,
U.S.A.

A REPLY

By P. W. S. ANDREWS

I SHALL reply to Mrs. Hall and to Professor Efroymson separately.

I

1. I regret that Mrs. Hall does not wish to challenge my assumptions and propositions one by one, for she gives a misleading account of my position concerning retail trade theory when she arbitrarily reduces my arguments to her three 'pillars'. In its context, as we shall see, the first relates strictly to *manufacturing and primary* markets. The second offers no separate structural support to any part of my argument but is simply a lump chiselled from the first 'pillar'—which accounts for some of Mrs. Hall's difficulties in using it as if it were naïvely applied to the retail trade. So far as the third is concerned, surely the pillar of an argument must be some central proposition to be accepted or rejected, not an alleged failure to draw a distinction?

Since the ideas which give Mrs. Hall most concern related, in fact, to manufacture, I must be excused for first explaining them in their proper contexts.[1]

2. Mrs. Hall is generally inclined to read into my theories assumptions which conform with her own presuppositions but not with mine. This is often the case when she uses the phrase 'perfectly competitive'.[2] The latter, in her system of thought, is the logical antithesis of *the* uncompetitive market, and its 'welfare' implications colour the litmus-paper with which she judges and tests reality. She therefore implies throughout, falsely, that I am a 'perfect competition' theorist. Similarly, she asserts on p. 240 that I work on the assumption that 'perfectly competitive' markets automatically guarantee the social interest. I do not. I reject perfect competition as offering any practical standard for assessing the competitiveness of ordinary manufacturing (or retail) markets. Disliking 'welfare perfectionism', all that I would urge for a market which conformed to my definition is that it could not be said to work actively against the social interest, as 'monopolistically competitive' markets are supposed to do.

3. As I have said, Mrs. Hall's first 'pillar'—my definition of competition, as she quotes it, relates not to retail trade but to primary and manufacturing industry. This will be quite clear from p. 141 of my original

[1] Since I do not take up every case, I must give the general warning that not all of Mrs. Hall's quotations from me are strictly accurate, nor have all omissions been indicated, nor were their contexts necessarily those which Mrs. Hall now gives them.

[2] Cf. p. 243: ' . . . if we are to accept Mr. Andrews's description of their (i.e. retailers') behaviour in terms of the perfectly competitive model . . . '

article. At the end of a discussion of *these* markets, I suggest that the essence of a competitive market here is simply that no seller will be able to get a price which is higher than another potential seller would take for a product of identical specification.

This definition would enable us to retain the one characteristic of a 'perfectly' competitive market which seems essential, namely, that all sellers of identically specified products shall be able to obtain only the same price, which, for manufacture, I relate to normal costs of production in a quasi-Marshallian manner.

It also excludes any market showing the one characteristic usually taken as denoting a monopolistically competitive market, namely, that, given the prices of other sellers, a particular supplier will be able to sell his commodity at various prices by varying his 'supply'.

At the same time, we can take into our analysis, and apply a competitive standard to, markets of the type most prevalent in the real world where manufacturers do not necessarily produce identical products and where it is usual for them to obtain the preferential goodwill of their customers. Such markets are competitive on my view, if the possibility of cross-competition between manufacturers so limits the price which any one can obtain.

4. I agree that this concept of competition is fundamental to my approach, but I do not apply it so naïvely as Mrs. Hall suggests. So far as the definition itself is concerned, instead of meeting it and criticizing it in its own context, Mrs. Hall offers us two very large red herrings. I throw these into a footnote.[1]

[1] First, Mrs. Hall points out *as if I would deny it* that my definition assumes sellers to maximize their profits. She has no warrant for her implication. What I do deny is the assumption of modern theory that differentiation of products and buyers' preferences necessarily entail such particular elasticities of demand that businesses will maximize their profits through restricting their scales of output. Ordinary manufacturers' markets, where producers sell to other business men, seem to me to be competitive according to my definition, despite differentiation and preferences—normally taken to be the very stigmata of monopolistic competition. To deny the applicability of my definition to those markets seems to me to involve the denial of the assumption, which I am as anxious to make as Mrs. Hall, that the business-men customers will seek to maximize *their* profits. The assumptions to the contrary, involving irrational preferences, were adopted by modern theorists simply so that they could get the atomistic equilibrium of supply which had been found to be incomprehensible, if an industry were in perfect competition, in the strict technical sense, and if individual businesses had falling cost curves. The assumption of particular demand curves of finite elasticity was therefore invoked and justified by describing the customers of all businesses where differentiation takes place, or where cost curves fall, as if they were final consumers buying consumers' goods. In that case, of course, it was very easy to assume that such customers *must* be irrational in their preferences. (Cf. Mrs. Hall's later assertion that a competitive market necessitates 'literacy' on the part of the consumers. It does not. It merely demands that they weigh up what they get for their money, compare experiences, &c. It is an academic's error to confuse literacy with intelligence. Some of the keenest bargainers I have known would probably not pass Mrs. Hall's tests of literacy!)

This brings me to Mrs. Hall's second red herring—the achievements of the modern theory of business. I am not going to be provoked into seeming disrespect for the great achievement

It should now be clear that the reference to 'his type of *product*' (n.b.) must also relate to manufacturing industry. The phrase was used because I hoped to prevent the purport of my definition being needlessly misunderstood because of presuppositions that competition required the *actual* presence of a large number of sellers of the particular product under question, or even of the technically related products which may be subsumed under 'that type of product'. It is certainly not necessary for a market, if it is to be fully competitive according to my definition, actually to include a large number of 'similar sellers'. (This incidentally disposes of Mrs. Hall's point on p. 243.) The essence of my theory is that a manufacturer in an established industry will tend to set such a price for his product as not to provoke competition on price from others, whether or not they are *already* making his exact product, or, indeed, are already in his 'industry'.

5. In the theory of price in manufacturing industry, it is possible to concentrate on the physical product, partly because that is so large a part of the ordinary transaction but also because it is possible to imagine fairly realistically that any associated services (credit, delivery, &c.) are included in the specification of the product. When I turn to the theory of retail trade, I certainly do not argue in terms of identically specified commodities, and recognize that any theory must allow for the fact that 'associated services' may be both very varied and very important.[1] Readers should refer, for instance, to pp. 148–9 of my article and not be misled by suggestions that I do not recognize the diversity of retail trade.[2]

6. In my approach to the theory of retail trade, I use my theory of manufacturing prices to account for one important element in retail prices

of this theory in solving its theoretical problems, but does Mrs. Hall really believe that we have been able to go farther along the road of explaining the determination of actual prices than when we had Marshall for our guide? When confronted with accounts of the manner in which business men determine their prices, the most popular theoretical 'explanation', seen correctly, involves the abandonment of all the apparatus which has been so ingeniously constructed and the virtual abdication of the 'modern' theorist. The necessity of explaining the gross margin as such is ignored, and the relative stability of prices is explained by a device—the kinked demand curve—which would justify the maintenance of any price, once that had been decided. A slightly less popular solution ('it's all a matter of the degree of monopoly') has 'explained' the gross profit margin on a full marginal-equilibrium basis in the abstract, but has involved the extraordinary assumption, given the levels of average direct costs, that elasticities of particular demand curves, constructed according to the usual assumptions, remain constant over substantial periods of time and despite notable changes in real national income and in relative prices. It also necessarily retains the assumption of restricted outputs which I find extraordinarily unrealistic.

[1] At the same time, we must not let traditional theorists throw dust in our eyes by statements implying that all retail commodities are bought on account of associated services at the point of sale.

[2] On p. 152 I give *as a simplified model* a case where all the retailers in one line of business are supposed to be offering identical commodities with identical services attached. This, however, is explicitly said to be constructed in order to show the effects of my arguments in such a simple situation.

—the cost of the commodity to the retailer.[1] This allows me to concentrate on the gross profit margin which may be taken as the rest of the retailer's price. The competition between retailers is then seen as determining the value which they offer for the gross margins which they charge. I shall not repeat here the arguments which I have already given on pp. 148–50. The real point of difference between Mrs. Hall and myself is that I am prepared to assume that ordinary people have a large measure of rationality when they go shopping, reinforced by collective wisdom and by advice from other people. She is not. I also notice that, significantly, she does not take up the Ward–Perkins point, as I may call it (p. 151)—that it needs only a proportion of the whole body of consumers to be sensitive to price and quality for any individual retailer to find there is a very elastic 'bonus' of demand available to him. This alone seems to me a very reasonable ground for challenging the validity of monopolistic competition, but, as indicated, I am quite prepared to trust to the measure of rationality which I find to be possessed by ordinary housewives. Prices, and quality for price, and the relative merits of different shops, play a large part in their conversation.

Granted this general assumption, then, I am quite consistent in assuming that in the long run the prices at which manufactured commodities are offered at retail must make sense to the final consumer in terms of quality and service. Given freedom of entry into retail trade, I am content to rest upon the argument that prices and qualities must in the long run be related to the normal costs of selling the commodities concerned, together with their associated services. In the long run, other retailers will compete effectively with one who offers less than the normally appropriate value for money, and the greater the 'rationality' of consumers, the shorter the long run will be. A retailer, when determining his quality–services–price policy, will try to prevent potential competition from becoming actual.

7. For her third 'pillar' Mrs. Hall erects an alleged failure to distinguish between uniformity of price for a given article at a given time, and over a period of time. She says (p. 241), erroneously, that I do not explain the former. Perhaps she has not read beyond p. 151 of my article (which is the location of her farthest point of reference) and so has not come across the section of my paper headed 'conventional prices' (p. 153). I should

[1] In an aside on p. 244, Mrs. Hall says 'Mr. Andrews says that we need not bother about the wholesale trade'. Read just like that, what a crime I have committed! A glance at p. 142 of my article will show, however, that for once I am behaving in a time-honoured theoretical manner. In the context, I am clearly suggesting only that we can approach the problem economically with a model in which retailers buy from manufacturers direct. It would be easy enough to take account of the effects of wholesaling, if we were interested in it for its own sake or if we were considering the whole amalgam of trade in a general theoretical treatise.

have thought that the applicability of my arguments, say, to her cigarette example, was rather obvious. I return to this shortly.

8. Having now stated the general lines of my argument, which Mrs. Hall does not meet, and having justified the remarks which I made concerning the irrelevance of her three 'pillars', I shall now confine myself to particular points put forward by her in the body of her paper.

(*P.* 241) I have *not* argued any 'association between fluctuating prices and non-homogeneous commodities'. I refer Mrs. Hall to p. 140 of my article and assert that the rest of her p. 241 has no relevance to my arguments.

(*P.* 242) I was arguing against the naïve view that markets without short-term flexibility were essentially non-competitive. Mrs. Hall's application of elementary logic is, therefore, otiose.

Mrs. Hall's quotation at the top of this page is extremely inaccurate. If she had put *an* instead of *the* uncompetitive market, she might have doubted her interpretation. Had she quoted the whole sentence, her doubts would have been considerably strengthened.

I do not identify listed prices and price inflexibility over a period of time with prices which are uniform as between sellers. Mrs. Hall has, therefore, misled herself. I explain the latter separately—and have already referred to the section which is devoted to this conventionality of prices. Mrs. Hall's cigarettes seem to me to be a very good example from my point of view. The pre-war prices of 4*d.*, 6*d.*, 7*d.*, &c., for popular brands of ten cigarettes, now affected by subsequent rises in taxation, &c., seems to me to have been a very logical stratification of prices, of the kind which I have explained. To get his product stocked widely enough so that it was available for the mass market, a manufacturer would have to sell at one of these convenient prices. One would expect to find the most popular brands selling at the most popular price—namely 6*d.* for 10, now Mrs. Hall's 3*s.* 6*d.* for 20. The 1*d.* extra on 'Churchman' used to signify not only a real jump in quality but also a convenient interval in price. Had cigarette prices originally become established at the present high levels of taxation, my guess is that popular brands would have sold at some identical conventional price; certainly, it would not have been worth while differentiating by so small a step as at present exists.

Although a good example from mine, I do not think cigarettes a good example from Mrs. Hall's point of view. I suggest that they are one of the class of commodities where the actual physical commodity is what consumers want, and that associated services are unimportant. It is true that, from a given location, one shop may be nearer than another. But except for a paraplegic, whose friends refuse to take him out or to shop for him except over the minimum distance from his home, we tend to satisfy

our continual need for cigarettes from any shop that we happen to pass. If it has not got the brand that we prefer, no blandishments will induce us to take another brand as equivalent 'with its associated services' to the brand which we want.[1]

At these conventional prices, what the cigarette manufacturer had to do was to continue to offer a value for money which was at least as good as competitors could offer. Granted the nature of our demand for cigarettes, his price-maintenance policy ensured him the maximum market, by ensuring that his brands were widely stocked, &c.

(*P.* 243) My objection is that it is not *my* hairs that Mrs. Hall is splitting. My thesis, I have demonstrated already, does not require a large number of similar sellers—this would be true only in a market where prices were fixed on the basis of short-period equilibria. Secondly, I do not assume away geographical separation and diversity of service. Here I have already hinted that I think Mrs. Hall pays an exaggerated attention to the first, so far as many staple commodities are concerned. She writes as if the only population which would satisfy her abstract model were 'illiterate', or, rather, unintelligent, paralytics.

I still see no objection to the points put forward in the long quotation from me given by Mrs. Hall on this page. When I said incidentally that I thought the proportionate margin probably started as a simple way of fixing a price, I was, of course, referring to much earlier times. The point that I wish to make is that some such simple policy will meet the needs of the retailer but that competition will enforce normal quality for the gross margin that he charges. Further, and by the way, known and definite prices satisfy one set of consumers' preferences, as was rapidly established when the practice arose of marking goods in plain figures. The short-period inflexibility of retail prices reflects in origin the inflexibility of manufacturing prices, and that of overhead costs in the retail trade, but I shall not argue the latter point here.

The consumer has been able to manifest his preference for more or less service relatively to higher or lower prices by patronizing the appropriate shops. It is ridiculous to suggest there is no choice here. Conventional prices have developed only for commodities where they are appropriate from the consumer's point of view—and there he chooses on the basis of quality at each conventional level.

(*P.* 244) Mrs. Hall's doubts if more expensive articles cost more to sell than less expensive articles of the same kind would be resolved, I think, by an examination of the facts of particular cases. The factors of sales technique and rate of turnover, which she instances, are not independent

[1] Unless there is some exceptional reason for thinking we shall not be able to get the latter elsewhere.

of the price of the article. In general, more expensive articles have a slower turnover, therefore have higher stocking costs, demand more careful salesmanship, run more risks of having to be sold off cheaply for various reasons, are more likely to have to carry a post-sales service guarantee, &c. Often they are just the cases where the consumer insists on buying services as well as the actual physical commodity. Further, Mrs. Hall might allow that one has to pay more for more successful exponents of the art of salesmanship.

Mrs. Hall's general references to my p. 149 are misleading. It should be quite clear that the differing margins to which I refer there are those imposed on different types of product from the point of view of the normal costs of selling.[1] These are no *arrières pensées* on my part, but form an integral part of my thesis.

Referring to lines 12 and 13 of Mrs. Hall's first main paragraph, I do not expect retail prices to be uniform in the face of differing normal distribution costs. Shops which, *as types*, have differing distribution costs tend to specialize on the commodities for whose sale they have the greatest advantages. Thus, the large chain store, in order to get its economies, needs a large turnover; it therefore is located where many customers can reach it and specializes in the kind of goods for which it will get a large demand—i.e. goods in mass demand of a kind which shoppers are prepared to get and carry around on periodical shopping visits. Its lower costs mean that it can price on the basis of a lower margin, and its lower prices result in it securing its class of trade at the expense of other retailers who will have to specialize in commodities whose prices will cover their higher costs. This certainly does not conflict with my thesis that different *normal* costs of distribution will lead to different prices, or rather, gross margins, being established. It, equally, is quite consistent with identical gross margins for commodities with the same normal costs of distribution.

Finally, I leave it to the reader to judge if my appeal to the great diversity of shops generally available to the consumer in this country is really equivalent to my announcing summer because I have discerned, through my field glasses, one solitary specimen of *Hirundo rustica rustica*.[2]

II

Resale price maintenance (Professor Efroymson's paper, *p.* 246)

1. My paper argued against proposals to make illegal the *existing* practice of resale price maintenance by individual manufacturers. Its

[1] e.g. a clothing shop will normally take a higher margin on fashion lines, and a shop selling flowers and potatoes will take a lower margin on the latter.

[2] Mrs. Hall does not discuss my arguments concerning resale price maintenance. She merely asserts that this prevents technical innovation. She has not met my point that already we have retailers who are large enough to establish their own brands and to sell these in whatever manner they like, at their own prices, if that should pay them.

argument is not inconsistent with my 'confidence in competition', &c., for I maintain that, in the case of *some* commodities (which happen to be of the kind where the economies of scale are likely to be most important), resale price maintenance is necessary if manufacturers' brands are to be able to compete effectively in the long run in the final consumers' market and if the consumer is to have such commodities available for his choice to be exercised.

2. Introductory selling at reduced prices fixed by the manufacturer does not conflict with my proposition, for this is not equivalent to arbitrary loss-leader price cutting by a retailer.[1]

3. Professor Efroymson's statement that 'not all manufacturers of branded goods think that sale of their products at "cut prices" will reduce their sales' is correct. What is surprising is that he should suggest that this controverts my argument. I said (p. 161) that 'by itself, branding does not require that the manufacturer should fix the price of his brand' and went on to specify where he will normally find this desirable.

4. To take up Professor Efroymson's footnote 3: (i) I argue that loss-leaders will militate against economies of scale of production because they will be only temporary affairs so far as each particular commodity is concerned. The point of a loss-leader is that its price is markedly lower than that at which it is known to be available elsewhere; the motive to offer it on cut price terms will disappear with the cessation of its general stocking by competing retailers (ref. p. 162). The manufacturer will then have to face a diminished market for that particular branded product. (ii) I agree with Professor Efroymson that it is easy to exaggerate economies of scale, where a business increases its whole varied output *pari passu* (and have argued this elsewhere). He has, however, completely missed my point (p. 159) that we are concerned with the increased output of one particular specification, with consequent increased standardization of output. Would he dismiss economies of scale of this sort so lightly? (iii) He sees the development of manufacturers' brands as possibly splitting up 'the formerly common market'. Is not this a travesty of the historical position as far as consumers' goods are concerned? I cannot subscribe to the myth of a 'perfectly competitive' golden age. Manufacturers' brands

[1] As I made it clear, I was not concerned with collective price maintenance by retailers or by manufacturers. In England, however, so far as I can discover, resale price maintenance seems to have started with manufacturers (e.g. books and clothing) and originally it seems frequently to have been resisted by retailers. The pressure to force manufacturers to raise minimum resale *margins* merely indicates the extent to which manufacturers' price maintenance tends to keep retail margins down and conforms to the general experience that they are usually lower than those taken for similar unbranded commodities. This restraining influence has even made itself felt, also, on the prices of non-price-maintained goods, and has been very important over the last decade, when the tendency has been towards constantly rising prices.

(like the development of chain stores) have led to less differentiation in their respective markets and have increased the proportions of standardized commodities.

(*P.* 247) 5. I have already repeated my point that loss-leadership tends to be very temporary so far as the individual brand is concerned and that to encourage it would be to run the serious risk of losing permanent benefits from the direct competition of manufacturers in the final markets for the sake of temporary gains from price warfare. I was not concerned with individual retailers who may have low costs as compared with others of their class of outlet. They, in fact, will usually get far greater permanent gains from the normal exercise of their efficiency than they will from loss-leadership. I was specifically concerned with retail businesses which, as a class, show lower costs than other classes (e.g. chain stores). Such low-cost retailers are generally large enough to establish their own brands in the classes of commodities with which I was concerned, and could offer these at as low a price as would be consistent with their costs and the 'services' which they offer. They are therefore not deprived of any gains from low-price selling *of their own brands*. Loss-leadership offers additional gains, but at the expense of the established market of the manufacturers concerned. The temporary use of particular brands as loss-leaders helps them, especially during 'dead' seasons, to attract more customers to their stores. It does not follow that the consumer will find poor value when he gets there.

6. I am impressed with the extent to which such forms of retailing have been able to make an effective contribution through the provision of suitable commodities at low prices (and would therefore oppose, on similar grounds as those which I urge against the prohibition of manufacturers' price maintenance, any proposal to ban chain stores, such as I understand to be the case in Denmark), but that is no reason for their loss-leader advertising being encouraged to remove one other very important source of competition in retail trade.

7. To sum up: I see resale price maintenance by manufacturers as being the condition of consumers enjoying their present very extensive choice as between price, quality, and service. My argument looks essentially at the long-run situation; Professor Efroymson insists on the short-run advantages of price warfare. If that should uproot the whole basis of many established industries, as it would do in this country, and lead to the greater differentiation of consumers' markets, it would do a disservice which I should have thought outweighed such temporary and arbitrary advantages.[1]

[1] Referring to Professor Efroymson's footnote, I have already made the point that the lower costs of selling branded articles are usually reflected in the margins which are allowed by the manufacturers.

Advertising which creates wants (*p.* 248)

1. Surely the manufacturers who strive to invest their commodities with style are, in the mass markets with which I am concerned, *following* fashion and not creating it. They are thus advertising that their commodities have one particular quality which the consumer is seeking, and about which he knows sufficient to judge the accuracy of their claims. Fashion goods certainly are not in my lucky charm class, for they have a quality which the consumer who seeks to be 'in the fashion' can assess. (Let the sceptics ask their wives.)[1]

2. My point about persuasive advertising relates to advertisers attempting to persuade a consumer to take the commodity of a particular producer —a Chamberlin case, as it were. Professor Efroymson has not met my point that the special gain to such an individual's market will be short-run, since such advertising can, by its very nature, be successfully countered by other producers. Therefore, as I said (p. 169), established producers in a settled market tend to limit the amount of their advertising—unless someone else, for the sake of short-term advantage, starts a burst of advertising. In the latter case, the cost of such abnormal advertising must come out of profits and cannot be price-raising expenditures. Persuasive advertising, ruling out nostrums of the kind I indicated, cannot attach long-run goodwill to the advertiser, it is too vulnerable to the attacks of others. I therefore still insist that, with the exceptions I made, advertising is unimportant as a price-raising factor, so far as normal industry is concerned.

[1] Professor Efroymson's footnote on this class of commodity refers to collective advertising. I regret that I did not discuss this in my paper. Let me now argue that it will not increase prices as compared to the *status quo ante*. Two cases can be distinguished: (i) Where the industry is otherwise stable, but where the manufacturers feel that collective advertising will increase their common market and pay for its costs. Surely they will not herald their campaign with increased prices. If they do get increased sales so that the campaign is justified they will not then put up their prices. (ii) The more common case is where there is a temporary or permanent adverse shift of taste—as with beer in this country. The alternative to doing nothing will be to suffer the falling outputs and reduced profits. This *a fortiori* is not a case where prices can be increased to cover the new advertising expenditure. Such advertising will have to pay for itself by increased relative profits at the existing prices.

NUFFIELD COLLEGE, OXFORD.

UTILITY AND THE THEORY OF WELFARE

By W. E. ARMSTRONG

I

THE welfare-economist, whatever else he may assert about the concept of welfare as applied to a community, is bound to assume that varying alternative situations are characterized by variations of welfare that, if not determinate, are at least orderly,[1] so that of any two alternatives, *A* and *B*, either the asymmetrical transitive relation 'better than' holds between *A* and *B* in one of its two ways, or the symmetrical transitive relation 'as good as'.

The following assumptions are also made by probably all economists:

(1) *An individual, in varying alternative situations, is characterized by varying individual welfare, whether determinate or indeterminate, so that, if A and B are two alternative situations for a group, then for each member of the group it can be asserted that his individual welfare is higher, unchanged, or lower with A than with B.*

(2) (*a*) *If, for two alternatives, A and B, the individual welfares for some persons are higher with A than with B and none are lower, then the welfare of the group is higher with A than with B.* (*b*) *If, for every member of the group, individual welfare is the same with A and with B, then the welfare of the group is the same with A and with B.*

(3) *If an individual prefers alternative A to alternative B, then his individual welfare is 'higher' with A than with B.*

A further assumption is made by most economists, including all those of the preference-school, though we propose later to demonstrate its falsity:

(4) *If an individual is indifferent between two alternatives, A and B, then his individual welfare is identical in both situations.*

It is the contention of many economists, in particular those of the preference-school, that the above assumptions are sufficient to provide a basis for welfare-economics, i.e. that complete utility-data (preference maps) for the members of a group *can* throw some light on welfare-policy—some light on how a policy-maker should choose, in order to achieve the highest possible welfare, between the alternatives that are, in theory, possible for the group. There is, I suggest, no justification for such a view.

[1] The term 'indeterminate' will be used throughout in this sense, i.e. in the sense of 'ordinal' as contrasted with 'cardinal'.

II

Whenever an individual makes a choice between a number of alternatives, it is important to distinguish between the choice made and the 'way of choosing'. We will define a 'way of choosing' as the selection of a class of alternatives from the total presented, followed by a random choice from the selected class; or, what comes to the same thing, the rejection of a class of alternatives, followed by a random choice from those that remain. If there are n alternatives, then there are, of course, n possible alternative choices, but the number of 'ways of choosing' is the number of combinations of n alternatives, taken 1 at a time, 2 at a time, . . . n at a time. Each of the n alternatives has a determinate 'position' in the welfare-order of the n alternatives, i.e. the highest 'position', the 2nd highest, . . . the n'th or lowest, where $n' \not> n$. Each of the 'ways of choosing' or 'policies', as we may conveniently call them, yields a set of n' probabilities of achieving each of the n' 'welfare-positions', according to the welfare-information available. Any pair of policies can, therefore, be compared so as to give a determinate probability that the one has a higher welfare than the other; every policy can, therefore, be compared in this way with the 'zero-policy' of random choice (i.e. the policy of rejecting no alternatives). If, as is usually assumed, the individual knows which alternative is the best, then the policy of selecting that alternative, when compared with any other policy, yields a probability $> \frac{1}{2}$ that a better alternative is chosen,[1] and, as compared with zero-policy, the policy is considerably greater than $\frac{1}{2}$. If, however, the individual had no knowledge whatever of the welfare-order of the alternatives, all policies would be indistinguishable; the probability of choosing a better alternative on one policy as compared with any other would be exactly $\frac{1}{2}$; a zero-policy would be 'as good as' any other, if by a 'better' policy we mean one that is more likely to yield a better result than another.

Clearly, if the individual's aim is to raise his welfare, he must adopt a policy that has a probability *appreciably*[2] greater than $\frac{1}{2}$ of yielding a better alternative than zero-policy. Let us suppose that his welfare-information reveals a number of classes of alternatives, each class having the characteristic that there is one alternative, outside the class, revealed to be better than all the members of the class. Let the largest class that can be con-

[1] It is, of course, also 'certain' that the alternative chosen, when it is known to be the best, is not worse than would result from any other policy; and, as compared with some policies, it is 'certainly' better.

[2] When I assert that I am interested in increasing my welfare what I mean is that I am interested in increasing it 'appreciably'—an increase of less than, say, 0·001 per cent., would leave me indifferent. If I did not believe welfare to be determinate I should, presumably, be interested in a policy that probably raises my welfare, only if the probability were 'appreciably' greater than $\frac{1}{2}$.

structed in this way have m members and let n be the total number of alternatives presented. Then, only if n is not very large compared with m is it possible to find a policy that is 'better' (i.e. probability appreciably $> \frac{1}{2}$) than zero-policy.

The above conclusion follows from the fact that even the alternative that is better than all the members of the largest class, constructed as above, has an equal chance of being in any welfare-position, other than the m lowest positions, i.e. it has zero-probability of being in any given position from the lowest to the mth, and $1/(n-m)$-probability of being in any other given position, while a random choice from all alternatives gives a probability of $1/n$ of any given welfare-position.[1] But if n is large compared with m, $1/(n-m)$ is little larger than $1/n$, and the chance of a policy of rejecting the revealed worse alternatives giving a better result than zero-policy is, therefore, only slightly greater than $\frac{1}{2}$. It may be noted that, even if the welfare-information is insufficient to reveal a welfare-policy, some policies may be known with certainty to give better results than others, e.g. if all we know about an infinity of alternatives is that A is better than B, the policy of choosing A has a probability of 1 of giving a better result than the policy of choosing B, but that does not make the policy of choosing A a welfare-policy, since the probability of its giving a better result than zero-policy is only infinitesimally greater than $\frac{1}{2}$.[2]

The above conclusions hold, even if we assume welfare to be determinate, so long as no information, other than about the order of welfare, is available. No 'mathematical expectations of welfare' emerge, even if the welfare-order of the alternatives is completely revealed; we cannot have a 'mathematical expectation' of an unknown quantity completely unrestricted as to its range. If, however, some quantitative information is available, the position is different—the 'best' policy is clearly that which gives the greatest 'mathematical expectation' of welfare, and such a policy can be described as a welfare-policy if it gives a 'mathematical expectation' of welfare appreciably greater than that given by zero-policy.

A group of persons cannot be regarded as faced with alternatives of choice in quite the same way as that in which we speak of an individual as having before him alternatives between which he is perfectly free to choose. Nevertheless, all the alternative ways in which all the members might behave, restricted only by the compatibility of all simultaneous individual behaviours with what is possible for the group as a whole, constitute a set of alternatives that are, in the sense relevant to welfare-economics,

[1] To be meticulous, the probabilities are $1/(n'-m')$ and $1/n'$, where $m' \not> m$ and $n' \not> n$, since the number of welfare-positions may be $<$ the number of alternatives.

[2] In other words, the knowledge that one policy is better than another, when there are many alternative policies, is without significance.

alternative possibilities for the group.[1] These alternatives form a group-welfare order, and, by assumptions (1) to (4), this group-welfare order may be at least partially revealed. But, even if we assume group-welfare to be quantitative, utility-data can reveal, on assumptions (1) to (4), nothing whatever about these welfare-quantities (apart from their order). The possibility of the existence of a welfare-policy must, therefore, depend upon whether the maximum number, m, of alternatives revealed to be worse than some given alternative is not unduly small when compared with the total number, n, of all possible alternatives.

We have seen that the total number of alternatives consist of all the ways in which all the members of the group can have their individual welfares varied that are mutually compatible with one another. Let us take for consideration any one of these alternatives for the group. A class, selected from all the possible alternatives, can, in general, be constructed, such that some persons are worse off and none better off than with the given alternative. Clearly, no matter how large this class may be, it is bound to be insignificant as compared with the total of alternatives; it is far easier to find ways of making some persons better off and some worse off than to find ways of making some persons better off and none worse off;[2] n must always be very large compared with m, on the basis of the welfare-information given by utility-data on assumptions (1) to (4). We conclude that, on these four assumptions, complete utility-data are incapable of revealing a welfare-policy for the group, i.e. no policy can emerge that has a probability appreciably greater than $\frac{1}{2}$ of giving a better result than the zero-policy of random choice from all the alternatives. *A fortiori*, if assumption (4) is withdrawn, as I think it must be, there is no basis for welfare-policy, since even less is revealed by utility-data of the order of group-welfare than on the basis of all four assumptions.[3]

[1] e.g. all the ways of distributing a given physical national dividend; or all the ways of substituting items in the national dividend for one another, and distributing these substituted items; or all the 'feasible' ways of making such substitutions, &c. Each of these alternatives are alternatives of choice for the group (according to the assumptions we make as to policy-possibilities) and, therefore, constitute alternative situations for the individuals composing the group, but they are not, of course, alternatives of choice for individuals.

[2] If we take all the ways of distributing two commodities between two persons, illustrated by the familiar Edgeworth box, then the total number of alternatives, given no change in the commodities, can be represented by the area of the box, but the largest area representing alternatives that are worse than some one alternative is the largest area between two tangential indifference-curves; this area is necessarily small, compared with the total area, for normal indifference-curves.

Therefore, the policy of choosing a point on the contract-curve is not appreciably better than the policy of choosing a point at random within the box, on the basis of assumptions (1) to (4).

It should be noticed that this conclusion does not conflict with the conclusion that free exchange is an improvement on its absence. Given any point not on the contract-curve, free exchange selects a better point on the contract-curve.

[3] If alternatives of policy were sufficiently reduced in number, it would be possible for a welfare-policy to emerge. If, for example, it were postulated that either A or B could be

III

It may be deemed fortunate that no significant welfare-theory can emerge from our four assumptions, since assumption (4) is incompatible with our first three, when account is taken of the non-transitiveness of the indifference-relation.[1]

It is, clearly, possible for an individual to be indifferent between A and B, and between B and C, and to prefer A to C. By (3) the individual welfare of A must in that case be higher than that of C. Therefore the individual welfares of A, B, and C cannot be the same. It follows that an individual's welfare can be higher for one alternative than for another, even though he is indifferent between the alternatives, i.e. assumption (4) is incompatible with (3) and must, therefore, be rejected.

Before proceeding further there is an implication of assumptions (1) and (2) that we have to consider owing to its importance for the argument to be developed. According to (1) an individual's welfare with A is higher than, identical with, or lower than with B. According to (2) group-welfare rises or falls with the rise or fall of any one individual welfare. Provided that individual welfare is continuously variable, such a functional connexion between individual welfares and group-welfare is possible only if each individual welfare is determinate.[2] (2), therefore, implies that group-welfare is a rising (or increasing, if group-welfare is determinate) function of the individual welfares of the group. If there are n members of the group and, therefore, n quantities representing, each in their own units, n individual welfares, then the group-welfare has the characteristic that it rises for an increase of any of the n variables.

We are now in a position to formulate an assumption that, when com-

adopted *and there are no other alternative policies*, then, if some persons prefer A to B and none prefer B to A, it would follow that adoption of A is a 'better' policy than adoption of B. In this fantastic world assumptions (1) to (4) might allow some light to be thrown on welfare-policy. In a more realistic world it is sometimes possible to visualize a change followed by over-compensation of those who are made worse off by those who are made better off. If, however, over-compensation is possible it would be absurd, in any real world, to deny the possibility of under-compensation. It would, therefore, follow that the policy of choosing an alternative with over-compensation is no 'better' (i.e. has no 'appreciable' probability of being better) than the policy of random choice from all the alternatives (i.e. under-compensation as well as over-compensation, including the policy of no change).

[1] See my article 'The Determinateness of the Utility Function', *E.J.* 1939.

[2] In my article 'Uncertainty and the Utility Function', *E.J.* 1948, a part of the case for assuming utility to be determinate is shown to rest on the fact that individuals *do* order 'uncertain' alternatives in a systematic manner, on the basis of utility and uncertainty alone. It is there argued that, given the continuous variability of utility and uncertainty, no such ordering would be possible unless both utility and uncertainty were quantitative. For the same reasons, since group-welfare is a function of n continuous individual welfare functions, where n is the number of members of the group, no function, determinate or indeterminate, is conceivable, showing the required variability, unless the individual welfare functions are determinate.

bined with (1), (2), and (3), makes a theory of welfare based on utility possible:

(5) *Any individual welfare variation, sufficient to give rise to preference, causes a greater (or 'wider',[1] if group-welfare is indeterminate) variation of group-welfare than any individual welfare variation, sufficient only to give rise to indifference.*

This assumption is bound to be acceptable to most economists, including those of the preference-school, since it is implied by a much wider assumption that has gained very general acceptance, namely, that if some members of a group prefer A to B and the remainder are indifferent, group-welfare is higher with A than with B.

Unfortunately, the latter assumption is suspect, owing to the non-transitiveness of indifference. My indifference to A and B does not imply that my welfare is the same with A and with B (see above). If, then, when one person prefers A to B, a sufficient number of persons are indifferent as between A and B, although in fact their welfares are higher with B than with A, the possibility cannot be ruled out that the welfare of the group is higher with B than with A. Axiom (5) is proof against this objection and cannot, in any case, be denied by economists of the new welfare-school, for whom the wider but illegitimate assumption is essential.[2]

We shall find that, with the help of (5), utility-data enable group-welfare relations between a pair of alternatives to be asserted when nothing can be asserted on the basis of (1) to (4), and, in addition, disallow the assertion, in some cases, of welfare-relations that *are* implied by (1) to (4).

In the first place, if we have at least half the members of a group preferring A to B and the remainder indifferent, then the group-welfare of A is higher than that of B, since the total 'effect' of the indifference of n persons in raising group-welfare must, by (5), be less than the total 'effect'

[1] A variation of an indeterminate variable from a to c is 'wider' than from a to b, if the order of a, b, c is abc.

[2] Some economists, e.g. Little, have attempted to do without the concept of 'indifference' and to define 'preference' as choice, but, as I have suggested elsewhere ('A Note on the Theory of Consumer's Behaviour', *Oxford Economic Papers*, Jan. 1950), without success. Axiom (5) implies an ultra-subjective approach, which must be meaningless for those who adopt a behaviourist standpoint. What I am assuming to be the test of welfare is discrimination by the individual. If I am insensitive to a welfare-difference between A and B, then the welfare-difference really is, in an absolute sense, less than the welfare-difference between A and B that another person *is* able to appreciate. If, as seems possible, some living organisms, while choosing between alternatives in a behaviourist sense, are incapable of introspection and, therefore, of having 'preferences', then they do not suffer 'welfare', +ve or −ve; or, alternatively, the maximum range of welfare being below the threshold of discrimination, the welfare of such organisms can be ignored. In other words, individuals are, broadly speaking, as well off as they think they are. When, therefore, a preference or indifference is 'marginal' (i.e. on the razor-edge between preference and indifference), a welfare-difference is implied that has the same significance, no matter who the individual may be who has the experience.

of the preference of n persons in raising group-welfare—each 'indifference' is over-compensated by a 'preference'.

In the second place, utility-data are in theory available that enable us to reach conclusions even when some persons prefer A to B and some prefer B to A. Consider the two-person group α, β, and let APB for α and BPA for β. Let us suppose that there is a C for α such that APC and CPB, and let us suppose that there is a D for β such that AID and DIB. It follows from (5) that the situation A for α and β is a higher group-welfare than situation C for α combined with situation D for β, and also that the latter combination is a higher group-welfare than situation B for α and β. Therefore the group-welfare of A is higher than that of B.

More generally, if n alternatives can be thought of for α, to form a preference-series, $APC_1, C_1PC_2, \ldots, C_nPB$, and n alternatives can be thought of for β, to form an indifference-series, $AID_1, D_1ID_2, \ldots, D_nIB$, the group-welfare of A is higher than that of B. Thus, for a two-person group, the group-welfare relation between a pair of alternatives is always discoverable from the utility-data, except when both persons are indifferent, or when the number of terms of a preference-series, connecting the two alternatives, for one person, cannot be made equal to the number of terms of an indifference-series, connecting the two alternatives, for the other person.

The process of deriving the group-welfare relation between two alternatives, given the utility-data, is simplified by the use of the twin concepts of 'marginal preference' and 'marginal indifference'. These concepts readily emerge when we consider more precisely the implications of our four assumptions. Since, between two alternatives, A and B, APB or BPA or AIB must hold for an individual, and, since group-welfare rises with increase of individual welfare, there must be a minimum individual welfare-difference, consistent with preference, for each and every member of the group, and this minimum individual welfare-difference must, for every member, give rise to the same group-welfare relation. If we use the same number, e.g. unity, as a measure for this minimum welfare-difference for all individuals, a group-welfare function emerges having the simple characteristic that the same group-welfare variation results from any given individual welfare variation. In other words, group-welfare variation is a rising function of the sum of individual welfare variations.

Let us call the above preference a 'marginal preference'; then a 'marginal indifference' is also implied, corresponding to the greatest individual welfare-difference consistent with indifference. If we use 1 to measure the welfare-difference, given by a 'marginal preference', then 1 (in the sense of the upper limit of $x < 1$) is the measure of the welfare-difference, given by a 'marginal indifference'. If, now, we have a given preference, APB, we can resolve this into a series of marginal preferences, P_m, with or

without an indifference-remainder, i.e. $AP_m\,C_1$, $C_1\,P_m\,C_2$,..., $C_n\,IB$, or, alternatively, into a similar series of marginal indifferences, I_m, of the same number of terms (the asymmetrical marginal indifference relation being taken always in the same direction, i.e. $C_x\,I_m\,C_{x+1}$ but not $C_{x+1}\,I_m\,C_x$). The welfare-difference between A and B is, therefore, $> n$ and $< (n+1)$. For every member of the group a welfare-difference between A and B can thus be discovered from the utility-data, being +ve between two integers for those who prefer A to B, −ve between two integers for those who prefer B to A, while for those who are indifferent between A and B we know that the welfare-difference is, in each case, less than unity. By summation,[1] the welfare-difference between A and B (i.e. welfare of A minus welfare of B) is either at least +ve (in which case the group-welfare of A is the higher), or at most −ve (in which case the group-welfare of B is the higher), or lies within a range including 0 (in which case the group-welfare relation is not determined).

If now we have a set of alternatives, it follows that these alternatives can be classified by the group-welfare relations that can in theory be discovered from the utility-data, in such a way as to enable a class to be selected for rejection that is revealed to be of lower welfare than some one alternative. Furthermore, this class will, in general, be a large selection from all the alternatives. A welfare-policy that is not necessarily trivial has emerged.

IV

Although it is satisfactory to have reached the conclusion that significant welfare-propositions can emerge on the basis of assumptions (1), (2), (3), and (5), in contrast to the absence of any such conclusions on the usual assumptions, a really satisfactory theory requires a good deal more, namely, that the selected class, i.e. the alternatives that remain after rejection, should also have the characteristic that any choice from this class is virtually as good as any other.

[1] That a marginal preference indicates the same welfare-difference, independently of the person exercising the preference, may be proved shortly as follows. A marginal preference of any person has a greater effect on group-welfare than a marginal indifference (in the same direction) of the same or any other person by assumption (5). But a marginal preference is adjacent, for any given person, to a marginal indifference (in the sense that either is the boundary of the other). If, therefore, a marginal preference of one person has a greater effect on group-welfare than a marginal preference of another person, then the former's marginal indifference cannot have a smaller effect. But this would contradict assumption (5). Therefore, a marginal preference of one person must have the same effect on group-welfare as a marginal preference of any other member of the group.

If we assume that a variation of group-welfare is a function of individual welfare variation (a view that is questionable only on equity grounds to be considered later), it follows that a marginal preference implies an individual welfare difference that is independent of the individual. In other words, inter-personal comparisons of welfare variation are logically implied by assumptions that economists do not seem to question.

If we are prepared to accept assumption (5) I see no reason why we should not make a further assumption, as follows:

(6) *If, in a group, there is a variation of the situation of one individual, within the limits of his indifference, then the variation of group-welfare is trivial.*

With this assumption we have all that is needed to satisfy the above requirements, and it is an assumption, curiously enough, that even preference-theorists could hardly deny, since for them a variation within the limits of indifference gives no variation of group-welfare at all.

Assumption (6) implies, of course, that group-welfare is determinate (a conclusion that is not warranted by (1), (2), (3), and (5) alone), for, since group-welfare can vary within the limits of indifference, we are now asserting that that variation is small as compared with other variations and is, in fact, small in an absolute sense.

If group-welfare is determinate, the problem of policy becomes the problem of choosing an alternative not because it is *greater* than other alternatives but because it is *significantly greater*. In other words, if A is the alternative of greatest welfare within a set, there is no point in separating it from all those alternatives that are of smaller welfare to a trivial extent. Now if the effect of indifference on group-welfare is trivial, so also is the effect of 'marginal preference' (which is the 'limit' of a 'marginal indifference'). The conclusion follows that the welfare-differences between the members of the selected class are trivial.

If the welfare-differences between the members of such a class are trivial, that alone is not sufficient to prove that the choice of a member of this class is significant. It is also necessary that some alternatives outside this class should differ significantly in welfare from a member of the selected class. Now it is implied by (6) that some preferences are significant—it is, indeed, the clear significance of some of our preferences that makes the assumption that indifferences are trivial axiomatic. Clearly, the preferences for A over B by the members of a group often are significant and, when they are, significant welfare-differences can be generated. When, however, the preferences are trivial, it is not surprising if welfare-differences also are trivial and that the only welfare-proposition to emerge is that it matters not what choice is made.[1]

The fact that it is possible on the basis of utility-data that are, in theory, available, to assert how a group should behave in pursuit of welfare, no matter what the alternatives may be and no matter how preferences are

[1] Perhaps the most serious criticism of a welfare-theory that did succeed in emerging on the lines that have recently been tried by preference-theorists would be the absence of any test for distinguishing between significant and trivial welfare-propositions.

distributed, might yet be of little practical significance owing to the practical difficulty of assembling the utility-data. Fortunately the facts of preference come to our aid in a way that has not yet been considered. Preferences do, in fact, vary in strength and an individual has no difficulty whatever in distinguishing between a strong and a weak preference. Moreover, some approximation to a preference that is strictly marginal can be discovered by direct introspection; what is just perceptible is revealed to the individual directly and an individual is aware of preferences that are just perceptible as such. Furthermore, non-marginal preferences are clearly distinguishable as varying from weak to strong. If, then, we take the two-person group, α, β, with α preferring A to B, and β preferring B to A, the utility-data required for solving the group-welfare comparison are, in point of fact, given with the preference-data, since both α and β are aware of the strengths of their preferences. So long as the unit in which α and β measure their preferences is the same, the problem is solved, and the use of the same unit is ensured if both parties use the same number to describe the preference-strength of a 'just perceptible preference'.

Of course, in practice, the measurements made cannot but be rough-and-ready. There is no clean knife-edge of just perceptible preference—preference passes into indifference through a thin margin of what may be called hesitant preference. In comparing one preference with another, an individual is rarely able to say more than that they are roughly the same, or that one is at least twice or not more than three times as great as the other. There is, it must be admitted, even a likelihood of inconsistencies, if an individual is pressed to quantify his preferences with any accuracy. Such considerations serve only to reinforce the approach to welfare-theory we are recommending. The range of variation of preference-strength is so great, the difference between a barely perceptible preference and an overpowering preference so enormous, that any alternatives that merit policy-consideration will still give rise to a selected class in the way described above, even if every measurement is given as a quantity with a large $\pm$ tail. Greater accuracy would indeed be objectionable, for the simple reason that what is important can only be what is clearly discriminated by an individual. If every member of a community weakly prefers A to B, then A is better than B only to a trivial degree and the proposition is of no significance for policy; but if one member of the community has an overpowering preference for B when the remainder weakly prefer A then B is significantly better than A and the discovery is important for the policy-maker.

V[1]

Unfortunately I find it necessary to register a doubt about assumption (5). This doubt arises from a belief (admittedly incapable of proof) that individual welfare is fully determinate in the sense that one individual may have absolutely more of it than another.[2] If and when there is considerable disparity between the individual welfares of two persons, it does not seem to me axiomatic that a preference of the individual with the greater welfare necessarily has more effect on group-welfare than an indifference of the individual with the smaller welfare; or, to put the point differently, a maximum sum of individual welfares, defined in our way may yet not maximize group-welfare owing to a distribution of these welfares that I would call inequitable.

This consideration would be fatal to any welfare-theory based on utility-data if they throw no light on the relative magnitudes of individual welfares. Our assumptions would be useless for the discovery of group-welfare relations, except in the one case where everyone prefers A to B.

Fortunately it is possible to make an assumption that seems, on the face of it, reasonable; an assumption that restores the position sufficiently for an adequate welfare-theory to survive. There can be little doubt that an individual, apart from his attitude of preference or indifference to a pair of alternatives, may also desire an alternative not in the sense of preferring it to some other alternative, or may have an aversion towards it not in the sense of contra-preferring it to some other alternative. There seem to be pleasant situations that are intrinsically desirable and painful situations that are intrinsically repugnant. It does not seem unreasonable to postulate that welfare is $+$ve in the former case and $-$ve in the latter. If this be allowed, if we assume that every individual can think of situations of $+$ve welfare and others of $-$ve welfare, the comparability of individual welfares is established, even if the measuring-rod is somewhat clumsy. If, for example, A is an alternative of $+$ve welfare and B of $-$ve welfare for a given person and his preference for A over B is n (in terms of marginal preference), then, if the individual welfare-difference corresponding to a marginal preference is taken as 1, the individual welfare of A is $+$ve and $< n$, and of B is $-$ve and $> -n$. The limits within which welfare lies for any alternative is thus determined, and can be minimized by selecting two alternatives of the required kind that make n as small as possible.

[1] For the purpose of welfare-economics, in a limited sense, the considerations of this section can be ignored. Once we have succeeded in comparing the welfare of one person with that of another, we may regard the problem of establishing the possibility of welfare-economics as solved, since it may be claimed that welfare-economics should be concerned only with the problem of maximizing the sum of individual welfares.

[2] I am aware of great differences in my own welfare from time to time and I see no reason why much of my life could not be spent in a condition either of low welfare or of high welfare.

The degree of comparability of individual welfares that the above data supply might be inadequate for our purpose but for one obvious consideration. The only reason for our requiring a comparison of individual welfares is the suspicion, on grounds of equity, that if the welfare of one individual is considerably greater than that of another we are no longer justified in assuming that a preference of the better-off individual necessarily overweighs an indifference of the worse-off, and it seems a reasonable assumption that this compensation-failure only becomes appreciable when welfare-differences are considerable. But surely all that can be meant by 'considerable' in this connexion is at most that welfare-difference which exists between a minimum desire and a minimum aversion that constitutes our crude unit of comparison.

VI

In conclusion some reference should be made to a matter on which this discussion has an important bearing, namely, welfare-measurements of the national income. The welfare-theory that we have outlined makes it possible to compare roughly any two national incomes in the group-welfare sense, given full utility-data (on the usual assumption that the group is psychologically constant and income is consumed). If we neglect the equity-consideration and drop assumption (6), preference-data (without any assumption as to absolute utility or absolute individual welfare) enable any two national incomes of a given group to be compared with some precision in terms of a sum of individual welfares.

On the usual assumptions (1, 2, 3, and 4) comparisons are, of course, impossible with rare exceptions and then only in an indeterminate sense. Nevertheless, a way round this impasse has been suggested by preference-theorists. A national income can be regarded as a class of potentialities (e.g. all the ways in which as an aggregate of goods these may be distributed *or* all the alternative productions that are in theory possible with the same resources *or* alternative productions and distributions limited to those that are feasible, &c.). Unfortunately any method of classifying these potentialities on the basis of utility-data, that makes any pair of national incomes comparable (e.g. the methods first suggested by Kaldor and Hicks, and since abandoned), give rise to inconsistencies (as pointed out by Scitovszky), each of two national incomes being greater than the other in certain cases, while methods that avoid inconsistencies cannot be generalized so as to make any two national incomes comparable.[1] Despite these objections—and they are serious enough—there is, it seems to me, an even more fundamental objection to this kind of approach. Let us suppose that we have

[1] See P. A. Samuelson, 'Evaluation of Real National Income', *Oxford Economic Papers*, Jan. 1950, for the latest discussion of this topic and references to the literature.

two national incomes, I and II, and that for every distribution of I we can prove (using assumptions 1 to 4) that there is a distribution of II that makes some persons better off and none worse off. Can we regard this as establishing a significant relationship, as required by this school of thought? Surely it would be significant only if it were theoretically possible to know which of the distributions of II is, in fact, the best. This, however, cannot, even in theory, be known. But in the absence of such knowledge, II is in no sense a 'better' income for the community than I, since, even if we were given the choice and therefore the necessity of selecting a particular distribution, there would be no way of making a choice from II that is even 'probably better' than a choice from I.[1] It would seem to follow that potential welfare definitions of national income, based on the utility-data that are available on assumptions (1) to (4), are useless, and that welfare-definitions of national income can emerge only if the more realistic assumptions I have suggested are made.

It must, however, be recognized that recent theoretical work on national income measurements (in particular that of Hicks, Kuznets, Little) has had, as its object, to find a welfare-measure that is based on price-quantity data alone, i.e. it is an attempt to use only those utility-data that are implied by the system of prices and quantities. From such data much can emerge as to the preferences and indifferences of the members of the group, but nothing as to the strengths of individual preferences, measured in the way our assumptions require. If all that is given for two national incomes (even with markets perfect) are the price-quantity data in the two situations, we can suggest no better way of comparing such incomes than those proposed on the basis of preference-theory, but that is not to agree that any useful purpose is achieved by such attempts. If we are to compare two national incomes in a significant manner we need to know to what extent each individual is better off with one or the other and therefore how much each prefers his share of the one to his share of the other. Interpersonal utility comparisons are just as necessary for real national income evaluations as they are for determination of policy.

[1] Even in the case of $2n$ alternatives, n of which are better, 'one-to-one' than the remaining n, it is not an appreciably 'better' policy to choose from the 'better' class, merely on the ground of these welfare relationships.

UNIVERSITY COLLEGE,
SOUTHAMPTON.

THE GROWTH OF INDUSTRY ON TRADING ESTATES, 1920–39, WITH SPECIAL REFERENCE TO SLOUGH TRADING ESTATE[1]

By G. R. ALLEN

I

THE industrial trading estate is a product of the inter-war period. It is well known that it had an important influence on the growth and location of new enterprise, but little systematic study has been made of the economic aspects of trading estates.[2] The purpose of this paper is to deal with some features of this development with special reference to the estate at Slough, in Buckinghamshire. In more detail the paper mainly relates to the development of new types of manufacturing enterprise (often described in the 1930's as 'modern, light industries') and to the rates of failure of firms in the process of this development.

The main features of a trading estate are: (1) control by one central authority, sometimes a private firm, sometimes a public or semi-public authority, of an area of land to be used exclusively as sites for factories and sufficient in size to hold a large number of firms; (2) erection of factories, usually of a standard design although of varying sizes and often built in 'advance of demand'[3] by the central authority to be leased, not sold, to

[1] The assistance I have received in collecting the material and presenting it in this paper is great. Mr. F. M. Page, secretary of Welwyn Garden City Ltd., gave me much of his time, and allowed me access to records. Mr. M. P. Fogarty, of Nuffield College, had already collected information on trading estates when I began my work, and this he made readily available to me. This is not my only debt to him. Mr. P. W. S. Andrews, also of Nuffield College, has been actively interested in my research since I began it: many discussions with him and, in particular, his comments on an earlier draft of this paper are embodied therein.

Above all, I am indebted to Slough Estates Ltd. and to many of the Company's staff, especially to Mr. L. P. Worthy and Mr. C. W. Fairall. The help I received on many visits to Slough was always most friendly and generous. Any contribution this paper may make to our knowledge of industrial organization is very largely the result of the co-operation of Slough Estates Ltd.

Very many other people suffered much from my curiosity and supplied me with information. Those who helped most include: Miss P. Gaskell and Messrs. R. L. Davies, J. Ilett, L. Mason, and S. R. Raffan of the Board of Trade; Miss V. A. George and Mr. F. Wynn Jones of the Ministry of Labour; Dr. E. R. Roper-Power; and Messrs. J. H. Pentney, E. Havers, and M. G. Cooper of British Railways (Mr. Havers's and Mr. Cooper's continued good offices secured me many interviews with industrialists at Slough).

Finally, my thanks are due to the Rector and Fellows of Exeter College, Oxford, who awarded me an Amelia Jackson Senior Studentship in 1948, and to the Trustees of the Houblon-Norman Fund. Their financial assistance made this study possible.

[2] To my knowledge, the only extensive published work by an economist is that of Mr. Fogarty. There has been much published material from town-planners.

[3] Some factories would be built without there being any specifically arranged tenancies of them. The estate company would then be able to offer a prospective tenant immediate occupation. This would be a *real* advantage, as will be evident later.

manufacturers; (3) provision of facilities by the central authority to be purchased by the tenants. Services available would always include gas, water, and electricity, and, on some estates railway sidings to individual factories and a piped supply of steam for manufacturing processes. Thus the aims of an estate are to enable a business man to hire on an extensive scale factors of production which otherwise he would need to purchase out of capital and to permit him to set up or expand his factories more rapidly than if he had to build for himself. The main activity which characterizes a trading estate is, therefore, offering factories for renting. Provision of other services is not so essential and, in fact, some pre-war estates did not provide all of them.[1]

An approximate estimate of the total employment on estates with rental facilities in September 1939 (excluding Dagenham Dock Estate) would be 45,000–50,000.[2] The Slough Estate would account for some 60 per cent. of employment on all estates at this date. Location of industry policy since 1945 has resulted in a large increase in the number of estates of the Slough model.

II

We can expect trading-estate facilities to influence industrial development in two interrelated ways: (1) by providing capital, and (2) by altering the relationship between paying-out and postponable costs.

Obviously the ability to rent a factory and to hire other estate facilities reduces the amount of capital which a business man requires before he can start a new enterprise or extend his existing enterprise, either on the same site or in a new district.[3] The testimony of the Macmillan Report suggests that for many years before 1931 there had been a lack of long-term capital for small firms (those requiring less than £200,000 in capital) and the setting-up of a government-sponsored finance corporation in 1946 to provide such credit indicates that the 'gap' was not thought to have been closed in the 1930's.[4] The trading estate has, however, provided indirectly part of the credit required by small firms and has thus helped to close the Macmillan gap. It is appropriate to consider, therefore, whether such provision has had any special influence on the growth of industry on the trading estate.

[1] Some notes on these estates will be found in Appendix I.

[2] Based on statistics in Appendix I.

[3] The existence of mortgage and hire-purchase facilities reduce the significance of this remark to some extent, because such credit also reduces capital requirements. A pre-war advertisement for a factory on an estate in North London suggests that at least one estate company charged an annual rent equivalent to 10 per cent. of purchase price, for a factory leased for 21 years, with option to terminate the contract at 10 or 14 years.

[4] Mr. Andrews suggests that taxation policy in recent years may have tended to increase the gap by (*a*) the increase in the standard rate of tax, (*b*) the liability for sur tax being kept at the old income level despite rises in prices, (*c*) changes in the way of assessing director-controlled businesses both for income-tax and death duties, and (*d*) related to the foregoing, the fall in the real income of the rentier class.

Such influence can occur in two ways. Firstly, the trading estate may enable a firm to start or to expand when otherwise this would not have been possible. Secondly, which is perhaps the more important, a firm on an estate can start sooner or expand more rapidly than would be possible if it were required to own all of its land and capital equipment; and, perhaps, since the firm's own capital is in a more liquid form, location on an estate increases future saving facilities.

This more rapid development may be significant since it means that a firm can get into production more quickly.[1] In this, there is not only the obvious cost aspect, but also an important reduction of risk because the amount of time required to reach a given level of output will be shorter.[2] (The greater ease of growth may not, of course, be an unmixed blessing if it encourages businessmen to be unduly venturesome!)

A business man wishing to start on a trading estate has only to prove his creditworthyness for the debts he is likely to incur with the estate company in the relatively near future.[3] If he were to try to obtain capital to buy the goods which he rents or hires from the estate company he would certainly be subject to a more rigorous examination and, perhaps, to participation in the control of his business by his creditors. Then, even if he has the necessary capital to make a beginning, there will be less limitation on his immediate growth if he settles on a trading estate because he will be able to use capital for, say, sales development which would otherwise be locked up in the building or, to use an example quoted frequently by estate companies, because he will not have to use part of his capital to earmark land adjacent to his factory for future expansion, as on the estate he will be able to move to a larger factory much more easily than he would if he were not on a trading estate.[4]

Some of these points can be illustrated by considering the case of firms forced into Great Britain as a result of the tariffs imposed in the early 1930's. In the first place, although such firms already had an established market in the country, there would be some risk that actual operation of

[1] This may seem an insignificant point, because pre-war a medium-size factory could be built in less than three months, but evidence from various trade journals supports it. See later, p. 276, n. 1.

[2] A previous footnote has suggested that in some respects a mortgage arrangement offers the same advantages as renting facilities. But to the extent that it leaves a business saddled with a more permanent debt it will have a different influence in respect to risk than will a rent agreement, especially as most estate companies gave tenants legal options to terminate leases within the full currency of contracts.

[3] This statement is based partly on Sir Noel Mobbs's evidence to the Royal Commission on the Geographical Distribution of the Industrial Population (referred to hereafter as the Barlow Commission), partly on accounts of trading-estates in various technical publications, and partly on the testimony of trading-estate administrators.

[4] Most trading estates allowed their tenants to exchange a lease for that of another factory, and in most cases allowed firms to have an option on land adjacent to their factories for a considerable period.

the manufacturing side of the business there would be unsuccessful. In this case the possibility of locking up capital in a building, which subsequently might be difficult to sell without loss, would be a deterrent which would be avoided by renting a factory on an estate. It is true that if a firm could operate successfully in an estate factory which would normally be of a standard design the risk involved in building such a factory for itself would be lessened because its asset would not be specific to its own modes of operation. But the other risk would remain that at the time when the factory came to be sold there would be no buyer at the required price. It would be less costly to throw in a lease on a trading estate.[1] Secondly, apart from any questions of risk, an immigrant firm would wish to get into production as quickly as possible so as not to lose any of its existing market. It is true that it could maintain this market by continuing to supply it from the factory abroad, but then the firm would have to bear, as a sales cost, some part of the tariff. The trading estate obviously has an attraction to such a firm. Moreover, there would be the advantage that an estate would be an already developed industrial area where the firm would be able to find the services it would need, and also the labour supply, and that these services would be obtainable through one central authority.

Similarly, a trading estate is a suitable place for a firm to establish a temporary branch to meet a sudden increase in demand. Although I do not deal with this point later, there is some evidence that it was relevant in the case of the Slough Estate, especially among those firms which had a parent plant there. It should be noted that an estate company would let factories on short leases, if the supply of factories at current prices were temporarily in excess of demand, and the speculative element in development often resulted in such an excess.

III

The question is whether these factors I have been noting are significant. This would seem to be so from the very growth of trading estates before the war. Certainly the various public and semi-public development organizations which were seeking to rehabilitate depressed industrial areas thought of the trading estate as a means of doing this.[2] A study of the advertisement brochures of the pre-war government-sponsored trading estates in the Special Areas supports the view that the suggestions I have made are not merely academic sophistications.[3] Perhaps the most

[1] Leases of trading-estate factories were usually for 21 years, with the option for the tenants to terminate them at specified intermediate dates, usually at 3 and 7 years, on the payment of a 'fine', often one-quarter's rent. Also an estate company would often try to relet a factory for an outgoing tenant, so as to reduce the liability of the firm. An estate company would be in a more favourable position for doing this than an individual firm.

[2] See also, M. P. Fogarty, *Plan your own Industries*.

[3] But see my remarks on pp. 281–283.

convincing evidence is provided by the experience of the growth of the industrial section of Welwyn Garden City.

Construction of Welwyn Garden City began after the First World War. At first progress was slow, partly because of the difficulty of attracting manufacturing industry to the town. Late in 1927 the company developing the town decided to build factories for firms to rent whereas, previously, all factories had been built and owned by industry. The new policy produced a very rapid change in the rate of inflow of firms, which is shown in the following table.[1]

TABLE I

No. of Manufacturing Firms arriving at Welwyn Garden City[2]

Period	No. of firms		
	Total	Owning buildings	Renting buildings
1922–8 . .	4	4	..
1929 . .	17	..	17
1930 . .	5	1	4
1931 . .	5	..	5
1932 . .	9	3	6
1933 . .	11	1	10
1934–8 . .	50	3	47

Finally, we may note the results of a survey carried out in 1935 and published in the journal, *Business*, in December 1935. By means of postal questionnaires an attempt was made to find out what had been the main

[1] See the evidence submitted to the Departmental Committee on Garden Cities, November 1932, and to the Barlow Commission by the Welwyn Garden City Company.

The advantage which a trading estate provides in enabling a firm to get into production quickly applies, although not to the same degree, to other areas where there are empty factories of such design that firms can readily adapt them for their own use. The recovery of Lancashire in the 1930's is to be explained partly by the availability of empty mills, suitable for use by other industries.

The journal *Business* published a series of articles summarizing interviews with business men in the 1930's. The following quotations support the view that available factories could, at least for some firms, be important in influencing choice of location.

'We tried to find a suitable building in the South before we came to Darwen. We wanted to start quickly and a standing building was essential.' Lancashire Silk Mills Ltd., *Business*, April 1935.

'Our parent company was already in Manchester: that was the main reason why we came here. But next to that we place the fact that here there was a big, suitable building, already standing.' Universal Products Ltd. *Business*, April 1935.

'We needed a standing factory, and had not the time to build.' A biscuit manufacturing firm, which had begun production on Tyneside in 1933. *Business*, January 1936.

D. H. Smith in *The Industries of Greater London*, 1933, gave availability of a standing factory as the reason why one of four firms recently established in Southgate had moved into the area.

[2] The majority of the data for this table was obtained from the records of the Welwyn Garden City Company by Mr. Fogarty. I have made a few adjustments to his data based partly on my study of the same records.

reason for choice of a particular location by those firms which had been recorded as opening a factory in a new location in the previous two years by the annual Surveys of Industrial Development published by the Board of Trade. Admittedly the results of the inquiry are not satisfactory for many purposes. Particularly, it suffers from a failure to distinguish adequately, in the questions asked, between inter- and intra-regional factors influencing location, and any attempt to determine *the* most important factor is accordingly meaningless. Also the use of the Board of Trade Survey to indicate the names of firms to whom questionnaires should be sent has the disadvantage of excluding all firms employing less than 25 workers. (One should add that there was, perhaps, no other suitable source.) Despite these defects, however, the results of the inquiry lend support to the arguments above. Some 27 per cent. of the answers recorded the need to be close to the market as being the main determinant of location; 23 per cent. listed the ability to rent buildings as being the most important factor.[1] Eight other possible reasons were listed, but none approached in significance the two mentioned.

IV

One is justified, then, in maintaining that the special facilities provided on a trading estate, and especially the renting facilities, do contribute to the development of industry in the area concerned.[2] We should expect there to be special features in this development, of which the following may be some.

1. There would be a greater rate of setting up of new firms. The greater ease of obtaining capital would suggest this. This would, of course, be related to (3) below.

[1] The implicit contrasting of these two factors illustrates the confusion between inter- and intra-regional factors, referred to previously. Professor Jones, as a member of the Barlow Commission, brought out the distinction in his questioning of a witness from the Board of Trade. But the point seems generally to have been overlooked in many discussions of location of industry policy. All factors affecting location cannot be treated on the same plane; certainly they should not be treated as competing influences. In the present context, while it is true that proximity to the market (or the size of regional income) might decide in which area a firm would seek to locate its factory, trading-estate facilities would be a very important factor in deciding the actual choice of location *within* the *already determined* area. It is likely, therefore, that the result above does not reflect very accurately the significance of trading estates as a locational factor. (Here I would record that any attempt to analyse the factors influencing location without reference to regional income flows, regional supplies of savings, regional marginal efficiencies of capital and so on is a very imperfect analysis. But such is very often current practice.)

[2] Mr. Andrews has suggested that a trading estate may have another advantage; it provides for the business man a milieu where he can mix with other 'young' entrepreneurs. It is true that at Slough new firms have been started by enterprise supplied jointly by firms already established, but there is no means of assessing whether this has occurred to a greater extent on the Slough estate than elsewhere or whether it needs a different explanation than that implicit in the earlier discussion of this paper. Certainly, I have never heard the satisfactions of an entrepreneurial gregarious urge (in this context) advanced as a specific advantage of a trading estate.

2. There would be a higher rate of failure of firms than is found in most non-estate industrial areas. This would be partly because the greater ease of starting a firm on an estate would encourage a greater relative proportion of firms whose prospects of success were low; similarly the smaller long-term commitments involved by starting on an estate and the ease with which those incurred could be shed would operate to increase the 'mortality' rate.[1]
3. Firms would be relatively small. This seems to follow from what has already been said about the Macmillan gap. (The point is not considered later.)
4. A relatively large number of firms would show a rate of expansion which would be higher than would be found on the average in non-trading estate areas.

V

It will be the purpose of the detailed study which follows of the growth of industry at Slough Trading Estate to throw light on these points. But before describing the results of this study one must consider the effect of the relationship between paying-out and postponable costs.

The relative ease of obtaining certain capital would seem to make industry more volatile on a trading estate than elsewhere. This also happens through the indirect influence of these facilities. The business man on a trading estate obtains some part of his capital at the price of being required to meet a quarterly rent payment. This cost must be met as it is incurred. However, if he has borrowed this capital by a normal method, or, if he has 'borrowed' it from himself, the interest charge may, if necessary, be deferred. For example, a business man with a good supply of capital of his own, part of which he has used to buy his factory, can be content in the short run with no return on that capital and, further, he can temporarily cease to amortise his capital or meet depreciation charges. But if he rents his factory these charges are all included in his rent and cannot be avoided.

In theory, then, the trading estate makes it easier for a business to be established or to be expanded, but, at the same time, increases the difficulties of overriding temporary adversity. In practice, is this fact important? For the established business I think not. This is the impression I have formed from talks with business men on trading estates. Further, information which I have received from five firms on estates shows that in the 1930's the total rent charge was never more than 1 per cent. of the value of their gross output (Census of Production definition).

[1] Special care is needed in interpreting such a result, if it is found to occur. It is considered in the general conclusions of this paper.

But the case is different for the new (small) firm. If it lacks capital, it will have no reserves to carry it through temporary difficulties. Its start will be eased because in the short period it has relatively high postponable costs—many functions will be carried out by owner-managers who are content with small returns for a time. But herein lies the rub. A cost, which to an established business, able and intending to pursue a long run price-output policy, is an almost insignificant part of total costs, will be a very significant item for a new firm with limited resources. For the new firm the rent payment will be an important part of the paying-out costs which must be met in the short run. Thus the new firm on the trading estate will be much more vulnerable to difficulties in developing its business than would be a similar firm which has been able to start elsewhere in a factory owned by itself.

The argument is supported by the practice of trading estates to allow reduced payments of rent in the earlier years of a firm's tenancy, payment of the rest of the rent being made in later years. Such arrangements were often stressed as advantages of taking a factory on an estate before the war, and I doubt if estate managements would waste advertising space to no purpose. Yet, the reductions in rent were usually small. For example, one estate often allowed on a rent of £160 a deferment of £40 in the first year and £20 in the second year.

The foregoing remarks would have little value if it could be shown that trading-estate managers consistently allowed their tenants extended credit to cover rent payments. Although it sometimes happened, one would not expect such credit to be granted frequently and certainly not on a long-run basis. Such a policy would be justified only where the estate had a number of empty factories which it could not expect to fill in the near future. Then the choice is between less rent now or empty factories. But this was not the usual experience for those estates established in the inter-war period, except, perhaps, for those in the Special Areas.[1]

If the estate company can expect normal growth (i.e. that new tenants will continue to come forward at the same rate as they have in the past) there are other considerations. If the tenant has to be allowed to defer the payment of his rent this may mean that his chances of developing a successful business are small, for the inability to pay his rent may indicate inefficiency. Thus the estate company will be taking a risk of total loss of rent for a factory which could be let to another tenant. Further, as an estate company hopes to obtain part of its business from the expansion of firms already on the estate, it will not wish to keep a tenant whose chances

[1] Where an estate company allowed a reduction of rent for a factory it would ensure that legal arrangements were such that it could quickly annul the recontract. Thus, it would be able to take advantage of any chance to relet the factory at full rent.

of expansion are virtually nil, if there is an alternative customer. But more than that, the estate company obtains part of its revenue from the provision of other services, such as supplying electricity or process steam. A firm that cannot afford to pay its rent may be working at less than full capacity with a reduced demand for the services provided by the estate. Clearly it will be in the interest of the estate company to get a more prosperous tenant, with better prospects of long-run growth.

VI

There is no need to say much about the rapid growth of Slough during the period between the two world wars. The facts are fully documented. Let it suffice to say that the numbers of workers registered at the Slough

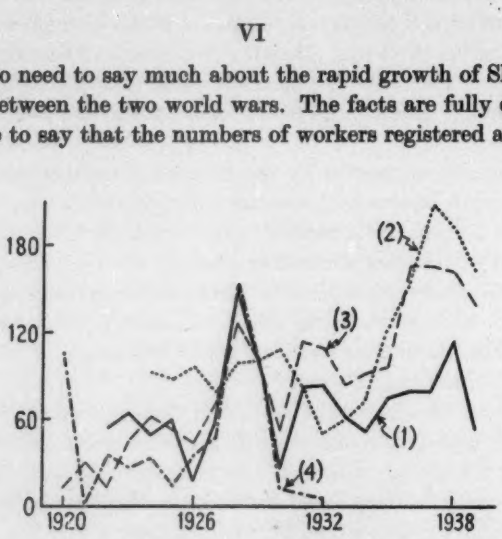


FIG. 1. Index Numbers from Table II.

Employment Exchange increased almost fivefold between 1923 and 1939.[1] Not all of the workers will have been employed on the estate (perhaps 60 per cent. of all industrial workers in Slough were on the estate in 1939), but there is no doubt that the impetus to growth came from the estate.

Table II and Fig. 1 show the material which illustrates the growth of the Slough estate.[2] There are two sets of comparisons to be made; between series (1) and (2), and between series (3) and (4).

The comparison of the rent bill index with Professor Bowen's series gives a fair measure of the relative growth of industry on the estate and

[1] This estimate is based on Ministry of Labour statistics which, despite their well-known limitations, do not give an erroneous picture here.

[2] For details of statistics on which parts of Table II and subsequent information on the Slough estate are based, see Appendix II.

in the United Kingdom as a whole. There is one imperfection in the rent bill index: it does not include the effects of extensions completed during the year. This omission should not change the index significantly, except

TABLE II

Index Numbers of Series relating to Growth of the Slough Trading Estate (1929 = 100)

	1920	*1921*	*1922*	*1923*	*1924*	*1925*	*1926*	*1927*	*1928*	*1929*
1. Rent bill of new arrivals at Slough estate during year . .	..	..	54	64	49	59	17	57	147	100
2. Value of output of factory buildings in U.K.	..	..	..	..	91	88	96	79	98	100
3. No. of firms arriving at Slough estate during year . . .	13	30	13	44	61	52	44	70	126	100
4. New enterprises registered in U.K. . . .	105	3	36	27	33	15	36	48	153	100
5. Factory space occupied on Slough estate	..	..	..	..	..	..	..	..	..	..
	1930	*1931*	*1932*	*1933*	*1934*	*1935*	*1936*	*1937*	*1938*	*1939*
1. Rent bill of new arrivals at Slough estate during year . .	27	82	83	63	52	74	79	79	114	54
2. Value of output of factory buildings in U.K.	108	83	51	59	72	123	154	208	192	162
3. No. of firms arriving at Slough estate during year . . .	52	113	109	83	91	96	165	165	161	139
4. New enterprises registered in U.K. . . .	12	9	6	..	..	..	..	..	..	..
5. Factory space occupied on Slough estate	..	..	83	..	87	..	..	114	..	126

Sources:

1. See Appendix II.
2. I. Bowen, 'Building Output and the Trade Cycle', *Oxford Economic Papers*, 1940. (The series on which this index is based is adjusted for changes in the cost of building.)
3. See Appendix II.
4. P. W. S. Andrews, 'Post-War Public Companies: A Study in Investment and Enterprise', *Economic Journal*, September 1937. Only the registrations for strictly manufacturing industries working in the U.K. have been taken from Table I of Mr. Andrews's article.
5. Private communication from Slough Estates, Ltd. (To make this series comparable, the indices have been adjusted to the same value as series (1) in 1932.)

to cause it to rise more steeply after 1934 than is shown. It is clear, however, that the rate of growth of industry on the Slough estate is greater than the national average until 1932 and that, thereafter, allowing for the omission of extensions from the Slough index and for the rise of the Bowen index from a deeper trough, the two developments occur at about the same rate. The slackening of the progress at Slough is probably due to the increasing competition among trading estates and the markedly

smaller average size of firm coming to the estate, as compared with the earlier period.

Facts to support the first of these reasons are given in Appendix I. However, this point should not be over-emphasized, as Slough's main competitors—Welwyn and the Chase Estate, Park Royal—were pursuing active policies long before 1932.

TABLE III

Average Consolidated Rent per Tenant arriving during Year (£'s)

1922	*1923*	*1924*	*1925*	*1926*	*1927*	*1928*	*1929*	*1930*
1,327	782	662	723	233	493	596	530	324
1931	*1932*	*1933*	*1934*	*1935*	*1936*	*1937*	*1938*	*1939*
418	404	406	303	450	255	261	374	213

Note. See Appendix II for definition of 'consolidated'.

The change in the size of rent bill per tenant is more significant. This can be seen from a comparison of series (1) and (3) in Table II and Fig. 1. The relationship is shown more clearly in Table III and Fig. 2.

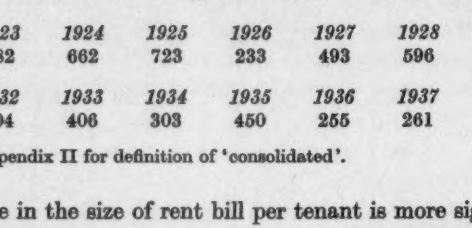


FIG. 2. Average rent bill among new tenants.

There is a very clear tendency for the average size of incoming firm, as measured by rent paid, to fall to the beginning of the 1930's and then to be stabilized at a size some half of that for the period 1923–7.[1] The fall is obviously not due to a policy determined by the estate company.

[1] This does not mean, of course, that the firms concerned decline proportionately in size as measured by numbers of workers employed. In fact, this is certainly not the case

Slough Estates Ltd. was determined to prevent its rent roll from being dominated by a few large tenants,[1] but this would mean that it would seek more tenants, not tenants with smaller rent bills.

The foregoing evidence is a fair comment on the emphasis that was placed in the 1930's on the use of trading estates as an economic (as distinct from a town-planning) device for developing or reviving an industrial area.[2] At the beginning of the period of economic recovery in the 1930's the Slough estate was already well developed and well known; it had many locational advantages; and there was plenty of room for expansion. Yet during this period the rate of growth of total factory development relatively to that in the country as a whole seems to have been lower than in earlier years. It is not surprising, therefore, that trading estates achieved limited results before 1940 in the Special Areas.[3] The experience at Slough was, perhaps, one reason why Sir Noel Mobbs advised the Barlow Commission that the trading estate could never become a major factor in industrial development.

The success of the Slough Estate would seem to be largely associated with two sets of events; the development of new enterprise in 1928 and 1929, of which the 'new issues' boom of the period was indicative; and the immigration of enterprise into the United Kingdom, caused by the introduction of tariffs in the early 1930's.[4] Both are clearly shown if one compares series (3) and (4) of Table II and Fig. 1. There is a high positive correlation between the growth of industry at Slough in.1928 and 1929 and the growth of new enterprise, as measured by the Andrews series. The evidence for 1931 and 1932 is shown by the contrast of the two series.

The consistency of the evidence with the suggestion in the theoretical part of this paper, that the special facilities offered by a trading estate make it very susceptible to the effect of variations in the state of trade on the inflow of tenants, is shown if we study the fluctuations of series (1) and (2) in Fig. 1. The recovery from the troughs in 1926 and 1931 and the peak of the boom in 1928 at Slough precede similar fluctuations for the country as a whole, although this relationship does not hold after

[1] Sir Noel Mobbs, Evidence to Barlow Commission.

[2] See M. P. Fogarty, op. cit.

[3] As Sir Noel Mobbs pointed out to the Barlow Commission, the initial limited success of the Special Area estates arose largely from tenancies being taken by firms already situated in the Areas. The role of these estates was rather to provide an increased local supply of capital than to attract firms from elsewhere. Of course firms outside the Special Areas did establish factories, usually branch factories, and refugee entrepreneurs were forced into the Areas through Home Office pressure.

[4] Personal knowledge of Slough (and Welwyn) show that the estate(s) received a large number of immigrant firms. Sir Noel Mobbs's evidence to the Barlow Commission suggests that before 1939 one-fifth of the Slough Estate's manufacturing tenants had come from abroad.

1931.[1] Further support for the same view comes from the close relationship between the timing and extent of variations in Andrews's series and the Slough series of new arrivals in the period associated with the new issues' boom. The evidence is not conclusive in itself, but it tends to support the idea that ease of getting into (or out of) production quickly is a *real* factor influencing industrial development on a trading estate.

There is also a case for expecting that firms on trading estates will expand rapidly, once they have overcome initial difficulties of starting the enterprise. It is impossible to secure comparative data to decide whether expansion of firms on estates occurred more quickly or to a greater degree than that of similar types of firms off trading estates. The pre-war annual Surveys of Industrial Development gave information on extensions, and it would have been possible to classify their material as between estates and non-estate areas. However, it is doubtful whether these surveys were sufficiently reliable for this purpose, and the classification was not made.

TABLE IV

Live Firms: Size of Rent Bill in September 1939 as per cent. of original (Consolidated) Rent for Firms using Expansion Facilities

Original Size (£)	*100–24*	*125–49*	*150–99*	*200–99*	*300–99*	*400–99*	*500–699*	*700–999*	*1,000+*	*Total*
0–89	1	..	5	8	5	2	3	1	1	26
90–249	1	1	4	2	3	..	4	1	2	18
250–309	..	..	5	5	..	..	..	..	..	10
310–459	..	2	3	4	..	..	..	..	1	10
460–699	..	..	1	..	..	..	..	..	..	1
700–1,399	1	1	3	2	..	2	..	..	..	9
1,400+	1	..	1	..	..	..	..	..	..	2
Total	4	4	22	21	8	4	7	2	4	76
Percentages	10		29	28	16		17			100

Accordingly, Table IV is given with little comment concerning the use of expansion facilities at Slough. Evidently, considerable use was made

[1] If, instead of the series (1) of Table II, series (3) is compared with Bowen's series, the lag is more frequent. But, as we do not know whether the average size of firm covered by the Bowen series varies from year to year, we do not know how valid is the second comparison. Here we can note that there may be another factor contributing to the size of the fluctuations of the Slough rent roll series. There is some tendency for the average size of a new firm (as measured by its rent) to be relatively high in the more prosperous periods of the estate's development, and relatively low in periods when the number of entrants was few (see Fig. 2). However, this does not nullify the remarks already made, as is shown by series (3) of Table II and Fig. 1.

of the facilities, especially by smaller firms. Further, we should not overlook 9 firms who moved to other sites before September 1939 after a successful period on the estate, and should not forget that of the 76 firms concerned in Table IV only 17 were on the estate in 1931. One has the impression (though it is only an impression) that the type of industry which went to Slough was able to expand more rapidly than it would have done if it had not enjoyed trading-estate facilities.

VII

The theoretical analysis and description of the arrival of firms at Slough might suggest that there would be a high rate of 'failure' of manufacturing enterprise.[1] This was so. For the period 1920–39 some 45 per cent. of all firms which settled on the estate were 'failures'. A more significant measure is obtained if only firms arriving before 1936 are considered, as those firms arriving after 1935 hardly had enough time to 'fail' before the outbreak of war. Some 60 per cent. of all firms arriving before 1936 were 'failures'. A limited number, 8, of these 'failures' were caused by the 8 firms moving to alternative locations off the estate.[2] It would be reasonable, therefore, to deflate the percentage of dead firms to 56 per cent. Yearly information is given in Table V.

TABLE V

Percentage of Firms arriving on the Slough estate in Specified Year which subsequently died

1924	*1925*	*1926*	*1927*	*1928*	*1929*	*1930*	*1931*	*1932*	*1933*	*1934*
50	42	80	56	83	65	58	50	44	53	57

The table gives the expected result—there is a higher rate of mortality of firms which are established in years of prosperity than among those established in years of depression. Further, most 'failures' occur within five years of the start of the firms concerned. For the 141 dead firms established before 1935, 75 per cent. 'failed' within 5 years. The risk of 'failure' appears to be similar within 1, 2, or 3 years of starting, although this similarity can be partly explained by the incidence of changes in the general level of prosperity.

The mortality rate of firms is clearly high in absolute terms. There are several possibilities for a comparative study.

1. As mentioned earlier, factories were available for renting at Welwyn from 1929 onwards. The following comparison has been calculated. At

[1] The definition of 'failure' is given in Appendix II. Suffice to say here that a failure is regarded as occurring when a firm leaves the estate, for whatever reason. 'Death' has been used as a synonym of 'failure'.

[2] Estimate based on conversations with various persons with long and thorough knowledge of the estate's history. Three of these firms moved to sites within ¼ mile of the estate.

Welwyn 57 per cent. of firms leasing factories between January 1929 and December 1935 were failures; at Slough the figure was 41 per cent. for the same period.[1]

2. The statistics of Mr. Andrews's article mentioned earlier give the next comparison. These statistics refer to a one-in-five sample of Public Joint-Stock Companies and cover a much wider range of industries than those found at Slough. The average size of the firms in the sample is certainly greater than that for the Slough firms; but, for this very same reason, the sample is the more likely to be representative of industry as a whole.

For the period 1920–30 the Andrews total sample shows a mortality rate of 33 per cent. of all firms started and dying in the period. The comparable figure for Slough is 73 per cent. Lest it should be said that the higher turnover of firms at Slough is to be associated with the teething problems of the estate, similar percentages have been calculated for the period 1927–30. The Andrews sample gives 36 per cent. and the Slough figures 74 per cent. Table VI shows a yearly measure of the mortality rates for Slough and for Andrews's series.

TABLE VI

Year of start/registration	*1923*	*1924*	*1925*	*1926*	*1927*	*1928*	*1929*
Percentage of Slough firms dying within 5 years of start.	50	27	31	56	33	79	52
Percentage of Andrews's firms dying within 5 years of registration . . .	0	19	26	20	15	36	39
Year of start/registration	*1930*	*1931*	*1932*	*1933*	*1934*	*1935*	
Percentage of Slough firms dying within 5 years of start.	33	42	27	50	57	41	
Percentage of Andrews's firms dying within 5 years of registration . . .	38*	..	..	..	..	..	

* Covers period of 4 years only.

Mr. Andrews presented information on the risk of failure within 5 years by product groupings for all firms starting in the period 1919–29 inclusive. Similarly, figures have been worked out for Slough, and the following comparisons can be made. The risk of failure in Mr. Andrews's sample for engineering, motors, and electrical engineering, is 41 per cent.;[2] that at

[1] The Welwyn figure is based mainly on the statistics collected by Mr. Fogarty.

[2] Obtained by combining three individual group estimates, weighting by the number of firms in each group in the Andrews sample.

Slough in Engineering (which includes the three groups) is 51 per cent.[1] Mr. Andrews's estimate for Buildings and Roads is 33 per cent. to compare with 70 per cent. for Slough.[2] Food Products compare 32 per cent. to 57 per cent. For Household and Personal Products Mr. Andrews's series gives 21 per cent. to compare with 34 per cent. for Chemical and Allied Trades at Slough.[3] It should be noted that the risk of failure for all Mr. Andrews's sample is 22 per cent.

In as far as Mr. Andrews's material is a reliable guide to the development of all new enterprise, it is clear that the rate of failure was much higher among enterprise on the Slough estate than for the country as a whole.[4] But it is equally clear that this greater rate of failure at Slough was partly associated with the type of product made by firms on the estate.

3. *The Silverware and Jewellery Working Party Report* shows that 27 per cent. of firms in all trades in one industrial district of Birmingham established between 1934 and 1939 had failed by 1939. For the jewellery and ancillary metal trades (localized in the same district) the rate of failure is 24 per cent. The rate of failure on Slough estate calculated on the same basis is 25 per cent.

The foregoing sets of evidence certainly show that the rate of failure for firms established on trading estates tends usually to be higher than that for firms established elsewhere. The explanation of this is partly due to the categories of industry which come to a trading estate, but partly the reason lies elsewhere. Limited evidence suggests that ease of starting up a firm is the second factor.[5] The extent of 'failures' and the variation over time in mortality rates reflect how far erroneous expectations influence industrial development on estates. Once again, there is support for the theoretical introduction.

It should be noted that the foregoing discussion may have tended to

[1] For the individual industries combined here the following are the 'failure' rates: wireless and electrical engineering, Mr. Andrews 60 per cent., Slough 81 per cent.; motor manufacturing, Mr. Andrews 47 per cent., Slough 27 per cent.; general engineering, Mr. Andrews 17 per cent., Slough 63 per cent. Mr. Andrews's classification of engineering probably included with the group those trades which at Slough have been classified as iron and steel and non-ferrous metal trades. The Slough percentage for engineering with these groups included is 47.

[2] The Slough figure is perhaps so high because of a relatively large inflow of nationally organized house-building firms, whose existence is obviously of a migratory nature.

[3] The product-content of this group of firms at Slough during this period makes the comparison much more valid than might be thought.

[4] My definition of a failure is slightly wider than that of Mr. Andrews (see notes on methods of compilation of my material in the Appendix). To an unknown degree, therefore, I have over-estimated the differences in the rates of failure shown by Mr. Andrews's and my data. But the error is probably very small.

[5] The following summary of Welwyn data is a comment on ease of entry in relation to rate of failure. Before 1936, 10 manufacturing firms occupied premises owned by themselves; of these firms 3 failed before September 1939; 54 manufacturing firms rented premises, of which 34 failed before September 1939.

over-estimate the total effect of the rates of failures of firms. For many purposes a more accurate measure of the influence of failures on the well-being of an estate is by a comparison of the number of failures in any one year with the total number of firms on the estate in that year. For the period 1923–39 the average extent of failure was 9 per cent. of all existing firms. The percentage was higher during the depression years. Once the estate was well established and general economic conditions were no longer depressed, 1 in 12 firms would leave the estate on the average from year to year.

There was apparently no significant difference in the rate of failure of firms of various sizes. If all firms are classified by size of consolidated rent bill and if we ignore the smallest group (this is legitimate because of the very large number of entrants to it in the late 1930's), there is little difference in the group mortality rates.[1] The similarity of mortality rates by size groups is shown more clearly in Table VII which uses data for the years 1927–35. In this way, any possible abnormal influences at both ends of the inter-war period are excluded.

TABLE VII

Average Size of Firms in relation to Mortalities of Firms 1927–35

Size of firm by rent	(1) *All firms arriving*	(2) *All mortalities*	(3) (2) *as percentage of (1)*
£			
1–89	26	16	62
90–249	37	18	49
250–309	37	24	65
310–459	42	28	67
460–699	11	6	55
700–1,399	25	13	52
1,400+	9	5	56
Total . .	187	110	59

Note. The size groupings used have been determined by the frequency distribution obtained by classifying the 187 firms by size.

VIII

The mortality rates of firms at Slough can now be examined to attempt a partial assessment of what differences, if any, in mortality rate exist between industries.

Apart from recording the total of arrivals and of mortalities in each group I noted the number of arrivals in each group which had arrived by

[1] Information is not available to classify firms by any other measure of size. But there is obviously a close correlation between size of rent bill and numbers employed.

a specified date. In this way it was possible to assess the extent to which a high mortality rate was due to a large number of firms in the group having started at an early date on the estate. Similarly, it could be seen whether a low mortality rate is related to late entry of the firms being considered. I have already shown that most failures occur within 5 years, so that if we consider the extent to which an industry or industry sub-group is established before January 1935, we shall be able to assess how important early or late entry has been. Similarly, I have used the dates January 1926 and January 1930 to divide up the period so as, on the one hand, to allow for any influences arising in the early years of the estate's development, and, on the other hand, to divide the decade before 1935 into

TABLE VIII

Mortality Rates by Product Groups

	No. of firms arriving	*No. of mortalities*	*No. of firms arriving before*		
			Jan. 1926	*Jan. 1930*	*Jan. 1935*
Groups with over 50 per cent. mortalities:					
Cardboard products	9	4	0	2	6
Printing	8	5	3	5	7
Confectionery	7	5	1	3	5
Miscellaneous foods	13	9	1	2	6
Jams, &c.	7	4	2	3	4
Soaps, polishes	8	5	2	6	8
Miscellaneous wood products	13	8	0	3	8
Miscellaneous building materials	10	8	3	5	7
Plastics, toys, &c.	14	8	0	4	10
Cast products	10	6	2	4	5
Wireless, gramophones	14	13	3	11	14
Other electrical engineering	14	11	3	6	11
Sub-total	127	86	20	54	91
Groups with over 25 and up to 50 per cent. mortalities:					
Clothing, excluding hats	7	3	0	2	2
Pharmaceutical goods	11	3	2	4	6
Miscellaneous chemicals	16	7	1	6	10
Furniture	7	3	1	3	3
Rubber	8	4	2	2	5
Scientific instruments	7	4	0	1	4
Machinery and mechanical engineering	17	8	2	8	12
Manufacture and repair of vehicles	12	6	4	7	9
Sub-total	85	38	12	33	51
Groups with less than 25 per cent. mortalities:					
Miscellaneous paper goods	6	1	0	0	0
Cosmetics	7	1	0	0	5
Aircraft manufacture	8	1	1	1	1
Tool manufacture	7	1	0	0	2
Miscellaneous engineering	7	1	2	2	2
Paints, varnishes, &c.	11	1	1	2	6
Sub-total	46	6	4	5	16
Total	258	130	36	92	158

the relatively prosperous and unprosperous years. No product group is considered here if it contains less than five firms throughout the whole period.

Table VIII provides data for various product groups.

The main conclusion from Table VIII is that the extent of mortalities in the various product groups is very much related to the timing of the arrival of the firms being considered. This can be seen if we consider the product groups as three sections. The firms in the section with the highest rate of mortalities have on the average an earlier starting date on the estate than the firms in the other groups; similarly, the firms in the middle section have an earlier start on the average than those in the section with the lowest mortality rates. This is shown in Table IX.

It seems clear that we shall not be able to measure a degree of risk of failure for each industry directly, so that we cannot make inter-industry comparisons on an exact basis. But we can use two approximate methods:

(i) In certain cases we shall be able to range one industry against others according to industrial mortality rates and dates of starting. There will be no exact measure, but we shall be able to say that industry A appears to have a greater turnover of firms than industry B, when note is taken of their relative dates of starting.

(ii) We can compare the average length of stay of firms which failed in various industry groups.

Table X presents the information relevant to the first method.

Columns (1) are the most important, and Columns (2) offer some check on a classification which can be made as follows:

1. *Product groups with above-average mortality rates*

Printing, Confectionery, Jams,[1] Miscellaneous Foods, Miscellaneous Wood Products, Miscellaneous Building Materials, Plastics and Toys, Scientific Instruments, Cast Products, Wireless and Gramophones, Other Electrical Engineering.

2. *Product groups with average mortality rates*

Clothing, Cardboard Products, Miscellaneous Paper Products, Soaps and Polishes, Miscellaneous Chemicals, Furniture, Rubber Products, Manufacture and Repair of Vehicles, Machinery and Mechanical Engineering.

3. *Product groups with below-average mortality rates*

Pharmaceutical Goods, Cosmetics, Paints and Varnishes,[2] Aircraft Manufacture, Tools, and Miscellaneous Engineering.

[1] This category included one very successful firm which moved to another site. In view of the size of the sample it might be safer to regard this sub-group as having only an average rate of failure.

[2] As far as Slough is concerned this low rate of failure is to some extent attributable to very soft water-supplies.

TABLE IX

Level of Mortality Rates by Product Groups in relation to Starting Date of Firms included in the Groups

Range of mortality rates	*Percentage of firms in product groups with indicated mortality which arrived before specified date*		
	January 1926	*January 1930*	*January 1935*
Over 50 per cent.	16	45	73
Over 25 to 50 per cent.	14	36	58
Under 25 per cent.	9	11	35
Total	14	36	61

TABLE X

Mortality Rates among Product Groups, distinguishing Firms established before 1935 and after 1934

Group	(1) *Arrivals before 1935*		(2) *Arrivals after 1934*	
	Nos. arriving	*of which failures*	*Nos. arriving*	*of which failures*
Clothing	2	2	5	1
Printing	7	5	1	0
Cardboard products	6	3	3	1
Miscellaneous paper goods	0	0	6	1
Confectionery	5	4	2	1
Jams	4	3	3	1
Miscellaneous foods	6	4	7	5
Soaps and polishes	8	5	0	0
Pharmaceutical goods	6	2	5	1
Cosmetics	5	1	2	0
Paints and varnishes	6	1	5	0
Miscellaneous chemicals	10	6	6	1
Furniture	3	1	4	2
Miscellaneous wood	8	5	5	3
Miscellaneous building materials	7	6	3	2
Rubber products	5	3	3	1
Plastic, toys, &c.	10	7	4	1
Scientific instruments	4	4	3	0
Cast products	5	5	5	1
Wireless, gramophones	14	13	0	0
Other electrical engineering	11	10	3	1
Manufacture and repair vehicles	9	4	3	2
Machinery and mechanical engineering	12	8	5	0
Aircraft	1	0	7	1
Tools	2	1	5	0
Miscellaneous engineering	2	1	5	0
Totals	158	104	100	26

The information for our second approach to the problem of mortality (to measure the lengths of survival of dead firms in various product groups) is given in Table XI on the basis of which the following classification has been made.

TABLE XI

Product Groups ranged by length of Life of Dead Firms and Extent of Early Start

	Groups ranged in order by	
	(1) *Length of life*	(2) *Extent of early start*
Paper, printing	2	8
Food products	5	7
Chemicals	4	3
Wood products	1	5
Stone, glass	3	1
Miscellaneous	7	6
Metal products	6	4
Engineering	7	2

Note to Table XI: Groups are ranged, starting with shortest life group and earliest starting group. (This is based on average of columns 3 and 4 of Table A.)

The statistics from which Table XI is derived are as follows:

TABLE A. *Mortality Rates of Firms by Main Product Groups*

Product group	*Failures as percent. of all arrivals*	*Percentage of total arrivals arriving before*		
		January 1926	*January 1930*	*January 1935*
Paper, printing	45	11	26	52
Food products	58	10	23	58
Chemicals	33	12	33	65
Wood products	53	5	32	53
Stone, glass	65	25	55	60
Miscellaneous	52	7	26	67
Metal products	53	18	29	59
Engineering	54	20	46	66
Unclassified	51	9	19	37
Total	48	23	32	57

TABLE B. *Percentage of Dead Firms which died within Specified Periods by Product Groups*

	All industry	*Paper and printing*	*Food products*	*Chemicals*	*Wood products*
Under 3 years	66	75	63	67	84
3–5 years	19	16	19	17	8
	Stone, glass, &c.	*Miscellaneous*	*Metal products*	*Engineering*	*Unclassified*
Under 3 years	71	60	63	60	81
3–5 years	21	20	12	27	14

1. *Product groups with above-average expectation of life*
   Engineering.
2. *Product groups with average expectation of life*
   Food Products, Chemicals, Stone and Glass, Metal Products, and Miscellaneous Products.
3. *Product groups with below-average expectation of life*
   Paper and Printing, and Wood Products.

The classifications into these groups must be regarded only as very tentative, partly because of the size of the sample, and partly because the percentages which have been used to rank the industry groups, by extent of early start cover a narrow range, except for Stone and Glass Products and Engineering.

IX

Certain observations seem to follow from the foregoing analysis of failures, although the data is obviously limited in scope.

1. Trading-estate facilities increase ease of entry into manufacturing and foster the more rapid growth of new enterprise. There are two results of this:

(*a*) Rates of failure tend to be higher than among firms producing similar products but able to begin production without the assistance of an estate. The comparative data we gave on pages 286–287 support this.

(*b*) One reason for the high total rate of failure of firms on a trading estate is that the estate tends to attract firms especially from those industries in which there is a relatively high degree of risk. In these industries the estate company tends to stimulate enterprise by, in effect,

TABLE XII

Risk of Failure in Industry in relation to Total Rate of Failure on Slough Trading Estate

	Number of product groups included	*Arrivals before 1935*		*Arrivals after 1934*	
		Number	*Of which failures*	*Number*	*Of which failures*
Product groups with above-average rates of failure . .	11	81	66	36	15
Product groups with average rates of failure . . .	9	55	32	35	9
Product groups with below-average rates of failure . .	6	22	6	29	2

Note. See Table X.

transferring on to its own shoulders some risks which otherwise individual entrepreneurs would need to bear. Table XII provides evidence on this point.

2. Although trading-estate facilities reduce the amount of risk which the individual business man has to bear, the available evidence suggests that these facilities do not favour one type of industry (when identified by product) as compared with another. This statement clearly applies only to those industries in which firms find production conditions suitable on estates.

The reason for this statement is that a comparison of the classification following Table X and Mr. Andrews's material shows that industries which appear in both analyses do not differ much in their degrees of riskiness, as shown in the following ranking.

Product Groups ranked by Rates of Failure, starting with Highest Rates

Andrews's material	*Slough material*
Wireless and electrical	Wireless and electrical
Motors	Building and roads
Building and roads	Engineering
Food	Food
Household and personal	Household and personal
Engineering	Motors

3. High rates of failures among firms is not a feature peculiar to trading estates. They will be found wherever there is little difficulty in starting a business. Information from the *Silverware and Jewellery Working Party Report* supports this view. The rates of failure were as high in the industries mentioned there as they were at Slough. (In retailing they were probably higher.)

4. If trading estates are used in the future on a large scale (which will be necessary if most of the estates established in the Development Areas are to be filled) we should not expect to find such high mortality rates associated with them as in the past. There is likely to be an effective limit to the supply of riskier types of enterprise which tended in the inter-war years to concentrate on the then few estates. Two broad groups of these riskier enterprises can be distinguished at Slough.

(*a*) Assembly and processing industries. Wireless, electrical engineering, and some processed foods are good examples. The manufacturer producing for immediate sale can purchase all of his raw materials—usually on credit—and his job is to put them together. In such cases entry is even easier than I have suggested is the case for industry in general.[1]

[1] For example, before the last war it was possible to buy every part used in making a wireless set, including cabinets, from 'producers' producers', the valve manufacturers supplying details of the circuits used.

(*b*) Industries in which the final supply of consumers' goods was markedly less than the expected long-run demand at some time in the inter-war period. Examples are wireless, pharmaceutical products, cosmetics, and (from personal knowledge of the Slough estate) firms included in the various miscellaneous product groups. In such industries, producers acting atomistically over-estimate the collective prospects of the industries and failures are inevitable.

Industries in these categories will obviously arise in the future and probably will tend to go to trading estates. But it is most likely that the rate of growth of trading-estate facilities since 1939 will mean that the amount of such industry going to each estate will be lower relatively than before 1939.

5. The average length of life of firms which subsequently died is more constant as between broad product groups than is the risk of ultimate failure for the industries I have studied. This is shown by considering the percentage of firms which fail within 3 years of starting.[1] (The statement is not correct if the percentage of firms failing within 1 year is used as the measure of expectancy of life.) This fact may be of interest to economists who are working on theories of risk and uncertainty.

6. The extent of failures does not vary much as between different size groups of firms. The average percentage failure for all firms established 1927–35 was 59 per cent., the range around this being 49 per cent. to 67 per cent. (Although the range of variation is not so great, a similar pattern can be noted as was found for the Birmingham Jewellery industry in the *Silverware and Jewellery Working Party Report*, namely that from the relatively high failure rate for the smallest firms there is a fall followed by a rise, and then by a final decline.)

It seems difficult to draw any more firm conclusions from this paper. The study of trading estates will, I hope, be valuable in its own right. But, more than this, when one studies those trading estates established before 1939 outside the Special Areas, one is laying one's finger on the pulse of an important section of new enterprise.[2] We know little about this form of economic activity. Particularly, we need detailed case studies of individual 'new' industries and of individual estates to clothe in flesh the

[1] See p. 292, note to Table XI.

[2] It might be argued that a large amount of enterprise established on the pre-war London area estates was not new enterprise, as it either came from abroad or migrated from existing sites in the United Kingdom, particularly from London itself. In the case of the few firms which could command large financial resources (for example, Roche Products Ltd. at Welwyn or Citroen Cars Ltd. at Slough) this is true. But most of the firms which came to these estates from elsewhere were small and would start on the estates with financial resources strained to the limit. Migration would be coincident with expansion. My own conversations with business men managing relatively small firms on estates certainly convince me that they regarded their moves to estates as equivalent to setting up new enterprises.

bare statistical bones which my paper provides. Further, a special theory of the firm may be required here. For example, whereas a long-run theory is more appropriate to explain the behaviour of well-established enterprises, a short-run theory may be required to analyse the activities of newly established ones which start with limited financial resources.

Part of my central thesis has been that trading-estate facilities assist firms to grow. It is appropriate to end by considering a criticism which I have heard frequently: that the instability on estates, which arises because of the ease of entry and which is shown by the high rate of failure of firms, is a price which cannot be afforded. As far as the answer lies within the scope of economics, and if it is conceded that the development of new enterprise is desirable, the following points should be noted.

1. Product for product, the rate of failure among new firms is higher when they are situated on an estate than when they are found elsewhere. But the difference is perhaps less than one would have expected.

2. There is danger of obtaining an excessively pessimistic view by considering numbers of failures in relation to new enterprise. As time passes, the body of firms which survive reduce the significance of a given proportion of failures among new arrivals in a particular area.

3. Estates do facilitate the growth of new enterprise. They enable firms to start which otherwise might never have done so and, presumably, there must be some net gain from this. Similarly, they most likely enable firms to expand more quickly than would otherwise have been possible.

4. As high rates of failure are a feature of the growth of new enterprise, a trading-estate company, by localizing the supply of resources which are temporarily rendered idle by the occurrence of failures and by pursuing a policy which seeks to re-employ these resources as quickly as possible, helps to reduce loss of social capital.

5. The high rates of failure found on trading estates before 1939 are partly explained by the peculiar susceptibility of these estates to fluctuations in the general level of economic activity. It is to confuse cause and effect to blame trading estates for the inability of governments to maintain economic stability.

AGRICULTURAL ECONOMICS
RESEARCH INSTITUTE,
PARKS ROAD,
OXFORD.

Note. The research on which this paper is based was, of course, carried out before I accepted an appointment at the Agricultural Economics Research Institute in 1949.

APPENDIX I

Some Notes on Trading Estates established before 1939

Some areas that were described in the 1930's as trading estates did not provide factories for renting, and, in the accepted sense of the term, were trading estates in name only. The following notes describe the main estates established before 1939 that *were* trading estates. They include industrial areas of certain garden cities and satellite towns which were developed largely by the offer of rentable factories. Where appropriate, the names of developing companies are given.

Slough Estate. Site taken over in 1920 by Slough Trading Co. Ltd. (later called Slough Estates Ltd.), the purpose being to dispose of surplus war materials, mostly vehicles, purchased with the site. There were factories on the site, some of which were let. Policy of estate development adopted in 1923. In 1939, 28,500 workers employed on the estate.

Although Trafford Park Estate, Manchester, had leased a few factories before 1914, the Slough Trading Estate is unquestionably the prototype of most subsequent development.

Kings Norton Estate, Birmingham. Developed as a subsidiary concern by Slough Estates Ltd. from 1932 onwards. In 1939 there were 57 firms, employing 1,500 workers.

Welwyn Garden City. Factory development began in 1920, but first factories leased in 1929. March 1939, there were 85 firms employing 4,250 workers. These included a few large firms owning buildings.

Special Area Estates. 1. Hillington, near Glasgow. Started in June 1937, and in May 1939 had 78 tenants in production (9 more having taken leases but not in production) employing 1,500 workers.

2. Team Valley, near Gateshead. Started October 1936. In May 1939 had 98 tenants employing 2,520 workers.

3. Treforest, South Wales. Started October 1936. In May 1939 there were 43 tenants in production, employing 1,870 workers.

Boreham Wood Estate, Hertfordshire. John Laing and Co. Ltd. Developed in late 1930's. In August 1948 there were 30 tenants employing 1,500 workers. (Limited industrial development between 1939 and 1948 in the Greater London area means these figures are a fair measure of the size of the estate in 1939.)

Weybridge Trading Estate, Surrey. Associated London Properties Ltd. Factories on the estate employed 800 workers in August 1948.

Great Western Trading Estate, Park Royal. Developed by Great Western Railway. Small estate, with about 10 small firms.

Letchworth. First Garden City Co. Ltd. A few factories were built for leasing in 1930's, but never in advance of demand.

Percy Bilton Estates Ltd. Various estates in the Greater London area, established in the 1930's. Factories leased if required, but developers preferred to sell factories. These estates were small. The estate at Perivale was perhaps largest of these. Development here started in 1934. My own estimate suggests there were 43 different firms on this estate during the period before the outbreak of war. Allowing for failures, the total at any one time would be less than this, and many firms owned their factories.

Chase Estate, Park Royal. Developed by Allnutt Ltd. The type of development similar to that on the Bilton Estates, although building started at a much earlier date. As in the case of Slough, the area was developed from a site used by the government in the First World War.

Commercial Structures Ltd. Similar type of development to that by Percy Bilton Estates Ltd.

Dagenham Dock Estate, Essex. Samuel Williams Ltd. Although factories could be leased, this estate was different from the others. It catered for firms requiring extensive transport facilities, including deep-water docking. In general characteristics it resembles Trafford Park Estate[1] rather than Slough.

APPENDIX II

Sources and Methods of Compilation of Slough Data

The chief source of information was the rent files of Slough Estat Ltd. From its earliest days the Company has maintained (and preserved) lease cards for each tenant occupying factories. These cards specified the following information of use to me: the number of the building concerned, the name of the firm occupying it, annual rent payable, the length of the lease concerned, and the date at which the first and, where appropriate, final payments of rent were due.

The annual rent attributable to the firm on account of its occupation of the particular building was clear, except in two respects. (1) In some cases in the 1920's the rent payment covered both gross rent and rates, which were then paid by the company. It was, however, possible to establish firmly that in the many cases for which the information could be obtained that rates were one-sixth of the rent payable to the estate company. Accordingly, where rent payments included rates, the recorded value was deflated by one-sixth to estimate the 'true' rent received by the estate company. (2) Certain very small factories (usually with an annual rent of less than £20) were rented on agreements which included supplies of heating and lighting. In a few cases, such factories were leased without a charge for heating and lighting included in the lease, these being then provided at tenant's cost. The difference of the charges for the two types of rental was used as the basis of deflation for the first-mentioned.

Date of starting was usually taken as the date from which rent payment commenced. There may have been a lag between commencement of a tenancy and occupation of the factory concerned, or, alternatively, the estate company may have allowed a tenant a short period of free occupation before rent became chargeable. These time discrepancies might be important if only quarter-day accounts were recorded. Thus there could be a maximum error of three months in my estimate of the starting date. But rents were very frequently shown as starting at other than quarter days. Neither tenant nor landlord (except in the cases which were recorded) was apparently prepared to make the other a gift of one quarter's rent. The number of instances on which the date from which rent became due did not fall on quarter day leads me to believe that the starting dates used reflect accurately when firms began production on the estate. In any case where the records showed that a firm occupied a building free of charge for some period, the date of starting was taken as being the beginning of occupation. (In any case, my calculations will give an exact timing of the making of decisions by business men to start or expand their businesses.)

Date of departure of a firm was taken as being the final day of the quarter in which the last rent payment was made, subject to three adjustments. In some cases the rent files contained more exact evidence of the date of termination of a lease. In other cases it was possible to see that a firm must have left a factory before the end

[1] By 1939 there were a number of 'estates', developed by one central authority, in which building sites were sold or factories built for sale and in which the main attraction was highly developed transport facilities, including docks for sea-going transport. These estates include Trafford Park Estate, Bromborough Port Estate in the Wirral peninsula, and the Dagenham Dock Estate.

of a quarter, as the same factory was being occupied by another firm.[1] In that case the date of leaving was taken as being the day before that on which the other firm became the tenant. Finally, in some cases, one firm assigned its lease to another one. The date at which the assignment became effective was taken as that of the departure of the first firm. Once again the extent of errors in timing would seem small, with a maximum error of three months, the chance of which would not be great.

Thus, by combining the details of a firm's occupation of all factories, information was obtained on date of start, date of departure (where appropriate) and rent bill at all times in the firm's life on the estate. One point should be especially noted about the rent bill. In some cases firms arrived at Slough and within a few months became tenants of much more factory space. In such cases it would seem virtually certain that the firm concerned had intended to expand soon after its arrival on the estate and that the original lease would not give a true measure of what a business man intended the size of his business to be in view of the expectations which had led him to establish his enterprise. To meet this point a firm's initial rent bill has been measured as that contracted by the end of a six months' period beginning at the day on which the first lease was taken. In the main text this is called the 'consolidated rent'.

The information necessary to classify firms by product groups was obtained from various sources. The report by P. E. P. on *The Location of Industry in Great Britain* and articles in *Business* gave such information for both dead firms and those that had survived past 1939. Other sources for firms that had left the estate by 1939 or by the time I began my investigation were the estate company's collection of 'dead' lease contract documents, a card index made by Mr. Fogarty of the records on which the pre-war Surveys of Industrial Development were based, the memories of many of the Estate Company's staff, and articles of association and related material deposited with the Registrar of Companies of the Board of Trade. For firms that were still in production when I visited the estate, the nature of their product then was used to classify them in the pre-war period, checks being made in those cases, mainly in the engineering industry, where I thought it likely that a firm had been producing pre-war goods which would fall into different product groups from those it was producing in 1948. The product groups classifications which have been used throughout this analysis are those of the 1935 Census of Production.

The difficult problem of the analysis was to decide whether a firm had failed, as defined in this paper; a failure being deemed to have occurred whenever a firm ceased to operate on the estate, for whatever reason. As far as possible an attempt was made to standardize my definition of failure with that used in earlier investigations. Accordingly, the following were regarded as failures: companies wound up by order of the court; creditors' voluntary windings up; companies which left the estate and which, as revealed by my later investigations, had been struck off the Register of Companies at a time reasonably close to the date of the firm's cessation of operations on the estate; companies wound up voluntarily, but not for sale, amalgamation, or reorganization; and companies wound up for reconstruction of capital. These were the main categories of failure in Mr. Andrews's article mentioned earlier.

My definition departs from that of Mr. Andrews's in two respects. Firstly, firms that left the estate to start business elsewhere were treated as failures, as their removal could cause for the estate company exactly the same problems of reletting premises as would occur when a firm failed—in a more normal sense. The inclusion of firms which moved elsewhere may be controversial in principle: but in fact the number of firms classified in this way was very small. Secondly, Mr. Andrews did not

[1] In many cases this check could be made from the rent files themselves. But, as a final check, the history of each factory was studied from the date on which it was first leased. (This was possible as all factories were numbered, and where the numbers changed during the period 1920–39 the fact was recorded.)

include in his definition companies wound up for sale or amalgamation because of the difficulty of determining the reason for the winding-up. Inspection of the Slough records showed that such transfers occurred frequently on the estate and I decided, therefore, to include them in my analysis of failures. I have treated as failures those firms which as a result of sale to or amalgamation with another company were subject to a definite change of controlling interests. I am satisfied that my analysis is accurate, given my definition of failure. In the majority of cases where the name of a firm ceased to be in the rent files, the Slough records contained categorical evidence that the firm had failed in a sense as used by Mr. Andrews; in many other cases persons with detailed knowledge of the history of the estate could give me information to the same effect. The other cases were determined by inspection of records held by the Registrar of Companies.

The Slough records contained very many references from one firm to another, as, for example, an assignment of lease from the one to the other, or a change of name of a firm involving a transfer of factory leases. Or again, inspection of the history of each particular building often showed a firm renting a factory immediately after it had been vacated by another one (i.e. one day divided the termination of the one lease and the starting of the other). Such cases as these were always checked to establish whether there was a continuity of enterprise or whether in fact a failure had occurred. In general, my procedure was not to build up my group of failures but to regard as a potential failure any tenant which ceased to hold leases in its existing name and to remove from this group those who could be established as not having failed.

The final problem of classification concerned the length of lease contracted by a tenant. Tenants on the Slough estate could take leases to run for various periods. The most frequent type of lease was that on a 21-year basis. A few leases were for periods varying in length between 3 and 21 years, and 3-year leases tended to be numerous. Below this length of period there was again many variations, with monthly leases being most common. I have classified a firm by the nature of its leases into three groups:

1. Short leases. Where all leases taken were on less than a yearly basis.
2. Medium leases. Where the main leases had 1 to 4 years currency.
3. Long leases. Where the main leases ran for periods greater than 4 years.

In both (2) and (3) it seemed obvious that if a firm had leases of different lengths at any time in its life on the estate it should be classified according to its longest leases.

Special Note

It has not been possible to publish with this article the detailed tables obtained from the analysis described above and on which the statistics relating to Slough in the main text are based.

The following are a few details from these tables. In the years 1920–39 the Slough estate received 500 tenants, of which 397 held long leases and 103 medium and short leases. There were 280 'failures', of which 179 were of long-lease firms. (The high rate of failure among the other firms is clearly understandable.) Arrivals of long-lease manufacturing firms were 360, of which 165 were 'failures'. The estimate of average rent bill per new tenant in Table III is always based on more than 9 entries, except in 1922 (5), 1924 (9), and 1926 (9).

The detailed Slough statistics in the article always refer to long-lease firms only.

437 L